

# **COST ANALYSIS**

## **CLASSROOM EXERCISES**



**FEDERAL ACQUISITION INSTITUTE  
OFFICE OF ACQUISITION POLICY  
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# SYLLABUS

<i>MONDAY</i>	<i>Start Time</i> <sup>1</sup>
Administrative	8:00
Introduction to Cost and Cost Analysis	8:45
Lesson 1 - Costs and Cost Analysis	9:30
Lesson 2 - Cost or Pricing Data	10:15
Lunch	12:00
Lesson 3 - Allowability	1:00
Lesson 4 - Data Collection	2:15

<i>TUESDAY</i>	<i>Start Time</i>
Lesson 4 - Data Collection (continued)	8:00
Lesson 5 - Work Design and Analysis	9:30
Lunch	11:30
Lesson 6 - Estimating and Analysis Techniques	12:30

<i>WEDNESDAY</i>	<i>Start Time</i>
Lesson 6 - Estimating and Analysis Techniques (continued)	8:00
Lunch	11:30
Lesson 7 - Direct Material Costs	2:00

<i>THURSDAY</i>	<i>Start Time</i>
Lesson 7 - Direct Material Costs (continued)	8:00
Lesson 8 - Direct Labor Costs	9:00
Lunch	11:45
Lesson 9 - Other Direct Costs	12:45
Lesson 10 - Indirect Costs	1:00

<sup>1</sup>All starting times are approximate and subject to change by the instructor.

<i>FRIDAY</i>	<i>Start Time</i>
Lesson 10 - Indirect Costs (continued)	8:00
Lesson 11 - Facilities Cost of Capital	8:20
Lesson 12 - Profit or Fee	8:30
Lesson 13 - Preparing for Negotiations	11:00
Lunch	12:00
Lesson 14 - Cost Realism Analysis	1:00
Test	1:30

## TEXT/REFERENCE READING ASSIGNMENTS

Advanced readings account for about 20% of the pages in this text/reference. We have shaded the advanced readings a light gray. We have added this additional material to make this textbook more useful to you as a desk/reference back on the job.



**There are no test questions on advanced readings. You are NOT required to read the advanced material.**

(The titles of some tables are shaded. You must read those tables, unless the whole table has been shaded.)

When	Chapters	Pages
Monday Night	Chapter 3	All
	Chapter 4	All
	Chapter 5	All
	Chapter 6	Pages 6-1 through 6-39
Tuesday Night	Chapter 6	Pages 6-40 through 6-94
	Chapter 7	All
Wednesday Night	Chapter 8	All
	Chapter 10	All
	Introduction (review for test)	All
	Chapter 1 (review for test)	All
Thursday Night	Chapter 2 (review for test)	All
	Chapter 12	All
	Chapter 13	All

# Costs and Cost Analysis

## CHAPTER 1

### 1. When should you do a price analysis?

- a) Only when cost analysis is not performed
- b) Only on small dollar purchases (less than \$100,000)
- c) All purchases whether or not cost analysis is required
- d) All purchases except where adequate price competition exists.

**2. Match the explanation to the cost estimating method:**

ANSWER	METHOD	CHOICE	EXPLANATION
	Detailed Analysis	A	Experts are brought together to develop the cost estimates with limited information on specifications
	Comparison	B	A thorough review of all components, processes, and assemblies
	Round-Table	C	Using historical cost of the same or similar item, costs are estimated and adjusted for future production

**3. Identify which of the following is NOT an aspect of cost analysis:**

- Evaluation of the effect of current practices on future costs
- Analysis of the offeror's make-or-buy program
- Analysis of all cost data submitted by the offeror to determine whether any additional data are necessary to make the proposal accurate, complete, and current
- Comparison of the proposed total cost plus proposed profit to prices for comparable contracts

**4. Which of the following best describes the relationship between the estimating system and the accounting system? Why?**

- There is essentially no difference
- The estimating system is the policies, procedures, and practices for generating cost forecasts while the accounting system is the primary source of cost information
- The accounting system is the ONLY source of information for the estimating system
- Difficulties in the accounting system generally do NOT impact the estimating system since one is concerned with incurred costs while the other is concerned with future costs.

## MOTLEY SYSTEMS

- Under which of the following circumstances can the contracting officer request or require the following from the offeror, Motley Systems?

	CIRCUMSTANCE	Request Limited or Partial Data?	Require an SF 1412?	Require a Certificate of Current Cost or Pricing Data?
1	Motley has submitted a bid for \$1,500,000 under sealed bidding procedures (other responsible bidders have also submitted responsive bids)			
2	Motley — the sole source — has submitted a proposal for \$501,000 to develop a <b>non</b> commercial item against a Government unique design specification			
3	Motley is submitting proposal for a change order that deletes \$401,000 worth of work and adds \$400,000 worth of work for a net change in contract price of \$1,000			
4	Motley — the sole source — is submitting a \$1,000,000 proposal for commercial items based on catalog pricing			
5	Motley proposes to provide an estimated \$1,000,000 of electrical power at rates set by the State's Public Utility Commission			
6	Motley — the sole source — is submitting a \$600,000 proposal for additional quantities of an item based on the competitively awarded price for the same item on a current contract			
7	Motley — the sole source — is submitting a proposal for \$90,000			
8	Motley — the sole source — is submitting a proposal for \$15,000			
9	Motley — the sole source — has submitted a price of \$1,000,000 but refuses to certify or divulge any other pricing information			

2. **If you require Motley Systems to submit a Certificate of Current Cost or Pricing Data, the certificate should be based on which of the following dates—and why:**
  - a. The date on the proposal
  - b. The date of the contract award
  - c. The date of agreement on price
  - d. The date all aspects of the contract have been negotiated, including price and terms and conditions
  - e. The date negotiations began
3. **Motley Systems frequently subcontracts substantial parts of its Government contracts. Which of the following statements about subcontract cost or pricing data is NOT true and why:**
  - a. Prime contractors may exempt subcontractors from the requirement for certified cost or pricing data if subcontractor prices are based on established catalog or market prices for commercial items sold in substantial quantities to the general public
  - b. The prime contractor is expected to exercise the same care on subcontractor price and cost analysis as the Government uses on the prime contractor
  - c. A sole-source negotiated subcontract valued at \$10,000,000 would require certified cost or pricing data (unless the requirement is exempted or waived)
  - d. The “flow-down” of certified cost or pricing data requirements is limited to the first and second tier subcontractors, only

**Using the attached FAR cost principles, interpret the allowability of the cost and, where possible, determine the dollar amount of allowable cost.**

1. A contractor needed a large number of certain types of highly specialized engineering skills to complete a priority Government contract. The contractor decided to take full-page color advertisements in leading newspapers throughout the country. The advertisements emphasized the challenge of the contract effort, salary, fringe benefits, and other benefits that would accrue to qualified persons selected to join the contractor team. Is the cost of these help wanted advertisements allowable? See FAR 31.205-1 and 31.205-34.
2. A contractor established a relocation site approximately 100 miles from the plant location to meet the requirements of civil defense authorities. The civil defense program of the company was to microfilm “key” records and reports and store the microfilm at the relocation site. The site rental, microfilm, labor, depreciation on microfilm equipment, and other expenses amounted to \$12,000 annually. Is this cost allowable? See FAR 31.205-5.
3. A contractor has production equipment that cost \$100,000 when acquired ten years ago. The equipment has been fully depreciated and records indicate that \$80,000, which is 80% of the total depreciation cost, was charged against previous Government contracts. This equipment is the type that is needed for use on a pending Government contract and it appears to be in good condition. It has been estimated that the equipment will have a useful life of 2.5 additional years. The contractor has requested that a use or rental charge in the amount of \$8,000 per year be allowed since the purchase of new equipment would cost much more. Would this use or rental charge be an allowable cost? See FAR 31.205-11.
4. The contractor's plant was located in a small mid-western town. Most of the work force in the community was employed by the contractor. The President of the firm had agreed to serve as Chairman of the local Community Chest drive. The company management felt a moral obligation to support this very worthwhile community project, and a contribution of \$20,000 was authorized. Would this be an allowable cost? See FAR 31.205-8 and 31.205-1.
5. Relocation costs in the amount of \$1,000 were incurred by an employee incident to the recruitment of personnel under a well managed recruitment program. Within a period of 10 months after hire, the employee resigned to accept a position with a competitor of the contractor. Are the relocation costs which were incurred incident to the recruitment by the first contractor allowable? See FAR 31.205-35.

**31.205-1 Public relations and advertising costs.**

(a) “Public relations” means all functions and activities dedicated to—

- (1) Maintaining, protecting, and enhancing the image of a concern or its products, or
- (2) Maintaining or promoting reciprocal understanding and favorable relations with the public at large, or any segment of the public. The term public relations includes activities associated with areas such as advertising, customer relations, etc.

(b) “Advertising” means the use of media to promote the sale of products or services and to accomplish the activities referred to in paragraph (d) of this subsection, regardless of the medium employed, when the advertiser has control over the form and content of what will appear, the media in which it will appear, and when it will appear. Advertising media include but are not limited to conventions, exhibits, free goods, samples, magazines, newspapers, trade papers, direct mail, dealer cards, window displays, outdoor advertising, radio, and television.

(c) Public relations and advertising costs include the costs of media time and space, purchased services performed by outside organizations, as well as the applicable portion of salaries, travel, and fringe benefits of employees engaged in the functions and activities identified in paragraphs (a) and (b) of this subsection.

(d) The only advertising costs that are allowable are those specifically required by contract, or that arise from requirements of Government contracts and that are exclusively for—

- (1) Recruiting personnel required for performing contractual obligations, when considered in conjunction with all other recruitment costs (but see 31.205-34);
- (2) Acquiring scarce items for contract performance; or
- (3) Disposing of scrap or surplus materials acquired for contract performance.

Costs of this nature, if incurred for more than one Government contract or both Government work and other work of the contractor, are allowable to the extent that the principles in 31.201-3, 31.201-4, 31.203 are observed.

(e) Allowable public relations costs include the following:

- (1) Costs specifically required by contract.
- (2) Costs of—
  - (i) Responding to inquiries on company policies and activities;
  - (ii) Communications with the public, press, stockholders, creditors, and customers; and
  - (iii) Conducting general liaison with news media and Government public relations officers, to the extent that such activities are limited to communication and liaison necessary to keep the public informed on matters of public concern such as notice of contract awards, plant closings or openings, employee layoffs or rehires, financial information, etc.
- (3) Costs of participation in community service activities (e.g. blood bank drives, charity drives, savings bond drives, disaster assistance, etc.)
- (4) Costs of plant tours and open houses (but see subparagraph (f)(5) of this subsection).
- (5) Costs of keel laying, ship launching, commissioning, and roll-out ceremonies, to the extent specifically provided for by contract.

(f) Unallowable public relations and advertising costs include the following:

- (1) All advertising costs other than those specified in (d) of this subsection.
- (2) Costs of air shows and other special events, such as conventions and trade shows, including—
  - (i) Costs of displays, demonstrations, and exhibits;
  - (ii) Costs of meeting rooms, hospitality suites, and other special facilities used in conjunction with shows and other special events; and
  - (iii) Salaries and wages of employees engaged in setting up and displaying exhibits, making demonstrations, and providing briefings.
- (3) Costs of sponsoring meetings, symposia, seminars, and other special events when the principal purpose of the event is other than dissemination of technical information or stimulation of production.
- (4) Costs of ceremonies such as corporate celebrations and new product announcements.
- (5) Costs of promotional material, motion pictures, videotapes, brochures, handouts, magazines, and other media that are designed to call favorable attention to the contractor and its activities (but see 31.205-13(a), Employee morale, health, welfare, food service, and dormitory costs and credits; 31.205-21, Labor relations costs; 31.205-43(c), Trade, business, technical, and professional activity costs; and 31.205-44, Training and education costs).
- (6) Costs of souvenirs, models, imprinted clothing, buttons, and other mementos provided to customers or the public.
- (7) Costs of memberships in civic and community organizations.
- (8) All public relations costs, other than those specified in paragraph (e) of this subsection, whose primary purpose is to promote the sale of products or services by stimulating interest in a product or product line (except for those costs made allowable under 31.205-38(c)), or by disseminating messages calling favorable attention to

the contractor for purposes of enhancing the company image to sell the company's products or services. Nothing in this subparagraph (f)(8) modifies the express unallowability of costs listed in subparagraphs (f)(2) through (f)(7). The purpose of this subparagraph is to provide criteria for determining whether costs not specifically identified should be unallowable.

(g) Notwithstanding the provisions of paragraph (d) and subparagraph (f)(2) of this subsection, reasonable costs incurred to promote American aerospace exports at domestic and international exhibits, such as air shows, trade shows, and conventions, are allowable. Such reasonable costs include transportation of the aircraft, aerospace parts and equipment, and other associated support cost. However, such allowable costs shall not include the cost of entertainment, hospitality suites or chalets, advertising media other than exhibits, and other costs not necessary to establish, operate or maintain an exhibit, display, or demonstration. This paragraph applies so long as Section 8062 of Pub. L. 100-202, or similar provision in a subsequent act, is in effect.

### **31.205-5 Civil defense costs.**

(a) Civil defense costs are those incurred in planning for, and protecting life and property against, the possible effects of enemy attack. Costs of civil defense measures (including costs in excess of normal plant protection costs, first-aid training and supplies, fire fighting training and equipment, posting of additional exit notices and directions, and other approved civil defense measures) undertaken on the contractor's premises pursuant to suggestions or requirements of civil defense authorities are allowable when allocated to all work of the contractor.

(b) Costs of capital assets acquired for civil defense purposes are allowable through depreciation (see 31.205-11).

(c) Contributions to local civil defense funds and projects are unallowable.

### **31.205-8 Contributions or donations.**

Contributions or donations, including cash, property and services, regardless of recipient, are unallowable, except as provided in 31.205-1(e)(3).

### **31.205-11 Depreciation.**

(a) Depreciation is a charge to current operations which distributes the cost of a tangible capital asset, less estimated residual value, over the estimated useful life of the asset in a systematic and logical manner. It does not involve a process of valuation. Useful life refers to the prospective period of economic usefulness in a particular contractor's operations as distinguished from physical life; it is evidenced by the actual or estimated retirement and replacement practice of the contractor.

(b) Contractors having contracts subject to 30.409, Depreciation of Tangible Capital Assets, must adhere to the requirement of that standard for all fully CAS-covered contracts and may elect to adopt the standard for all other contracts. All requirements of 30.409 are applicable if the election is made, and its requirements supersede any conflicting requirements of this cost principle. Once electing to adopt 30.409 for all contracts, contractors must continue to follow it until notification of final acceptance of all deliverable items on all open negotiated Government contracts. Paragraphs (c) through (e) below apply to contracts to which 30.409 is not applied.

(c) Normal depreciation on a contractor's plant, equipment, and other capital facilities is an allowable contract cost, if the contractor is able to demonstrate that it is reasonable and allocable (but see paragraph (i) below).

(d) Depreciation shall be considered reasonable if the contractor follows policies and procedures that are—

- (1) Consistent with those followed in the same cost center for business other than Government;
- (2) Reflected in the contractor's books of accounts and financial statements; and
- (3) Both used and acceptable for Federal income tax purposes.

(e) When the depreciation reflected on a contractor's books of accounts and financial statements differs from that used and acceptable for Federal income tax purposes, reimbursement shall be based on the asset cost amortized over the estimated useful life of the property using depreciation methods straight line, sum of the years' digits, etc.) acceptable for income tax purposes. Allowable depreciation shall not exceed the amounts used for book and

statement purposes and shall be determined in a manner consistent with the depreciation policies and procedures followed in the same cost center on non-Government business.

(f) Depreciation for reimbursement purposes in the case of tax-exempt organizations shall be determined on the basis described in paragraph (e) immediately above.

(g) Special considerations are required for assets acquired before the effective date of this cost principle if, on that date, the undepreciated balance of these assets resulting from depreciation policies and procedures used previously for Government contracts and subcontracts is different from the undepreciated balance on the books and financial statements. The undepreciated balance for contract cost purposes shall be depreciated over the remaining life using the methods and lives followed for book purposes. The aggregate depreciation of any asset allowable after the effective date of the 31.205-11 shall not exceed the cost basis of the asset less any depreciation allowed or allowable under prior acquisition regulations.

(h) Depreciation should usually be allocated to the contract and other work as an indirect cost. The amount of depreciation allowed in any accounting period may, consistent with the basic objectives in paragraph (a) above, vary with volume of production or use of multi-shift operations.

(i) In the case of emergency facilities covered by certificates of necessity, a contractor may elect to use normal depreciation without requesting a determination of “true depreciation,” or may elect to use either normal or “true depreciation” after a determination of “true depreciation” has been made by an Emergency Facilities Depreciation Board (EFDB). the method elected must be followed consistently throughout the life of the emergency facility. When an election is made to use normal depreciation, the criteria in paragraphs (c), (d), (e), and (f) above shall apply for both the emergency period and the post-emergency period. When an election is made to use “true depreciation,” the amount allowable as depreciation—

(1) With respect to the emergency period (five years), shall be computed in accordance with the determination of the EFDB and allocated rateably over the full five year emergency period; provided no other allowance is made which would duplicate the factors, such as extraordinary obsolescence, covered by the Board's determination; and

(2) After the end of the emergency period, shall be computed by distributing the remaining undepreciated portion of the cost of the emergency facility over the balance of its useful life provided the remaining undepreciated portion of such cost shall not include any amount of unrecovered “true depreciation.”

(j) No depreciation, rental, or use charge shall be allowed on property acquired at no cost from the Government by the contractor or by any division, subsidiary, or affiliate of the contractor under common control.

(k) the depreciation on any item which meets the criteria for allowance at a “price” under 31.205-26(e) may be based on that price, provided the same policies and procedures are used for costing all business of the using division, subsidiary, or organization under common control.

(l) No depreciation or rental shall be allowed on property fully depreciated by the contractor or by any division, subsidiary, or affiliate of the contractor under common control. However, a reasonable charge for using fully depreciated property may be agreed upon and allowed (but see 31.109(h)(2)). in determining the charge, consideration shall be given to cost, total estimated useful life at the time of negotiations, effect of any increased maintenance charges or decreased efficiency due to age, and the amount of depreciation previously charged to Government contracts or subcontracts.

(m) 30.404, Capitalization of Tangible Assets, applies to assets acquired by a “capital lease” as defined in Statement of Financial Accounting Standard No. 13 (FAS-13), Accounting for Leases, issued by the Financial Accounting Standards Board (FASB). Compliance with 30.404 and FAS-13 requires that such leased assets (capital leases) be treated as purchased assets; i.e., be capitalized and the capitalized value of such assets be distributed over their useful lives as depreciation charges, or over the leased life as amortization charges as appropriate. Assets whose leases are classified as capital leases under FAS-13 are subject to the requirements of 31.205-11 while assets acquired under leases classified as operating leases are subject to the requirements on rental costs in 31.205-36. The standards of financial accounting and reporting prescribed by FAS-13 are incorporated into this principle and shall govern its application, except as provided in subparagraphs (1), (2), and (3) below.

(1) Rental costs under a sale and leaseback arrangement shall be allowable up to the amount that would have been allowed had the contractor retained title to the property.

(2) Capital leases, as defined in FAS-13, for all real and personal property, between any related parties are subject to the requirements of this subparagraph 31.205-11(m). If it is determined that the terms of the lease have been significantly affected by the fact that the lessee and lessor are related, depreciation charges shall not be allowed in excess of those which would have occurred if the lease contained terms consistent with those found in a lease between unrelated parties.

(3) Assets acquired under leases that the contractor must capitalize under FAS-13 shall not be treated as purchased assets for contract purposes if the leases are covered by 31.205-36(b)(4).

(n) Whether or not the contract is otherwise subject to CAS, the requirements of 31.205-52, which limit the allowability of depreciation, shall be observed.

### **31.205-34 Recruitment costs.**

(a) Subject to paragraphs (b) and (c) below, and provided that the size of the staff recruited and maintained is in keeping with workload requirements, the following costs are allowable:

- (1) Costs of help-wanted advertising.
- (2) costs of operating an aptitude and educational testing program.
- (4) Travel costs of employees engaged in recruiting personnel.
- (5) Travel costs of applicants for interviews.
- (6) Costs for employment agencies, not in excess of standard commercial rates.

(b) Help-wanted advertising costs are unallowable if the advertising—

- (1) Is for personnel other than those required to perform obligations under a Government contract;
- (2) Does not describe specific positions or classes of positions;
- (3) Is excessive relative to the number and importance of the positions or to the industry practices;
- (4) Includes material that is not relevant for recruitment purposes, such as extensive illustrations or descriptions of the company's products or capabilities;
- (5) Is designed to “pirate” personnel from another Government contractor; or
- (6) Includes color (in publications).

(c) Excessive compensation costs offered to prospective employees to “pirate” them from another Government contractor are unallowable. Such excessive costs may include salaries, fringe benefits, or special emoluments which are in excess of standard industry practices or the contractor's customary compensation practices.

### **31.205-35 Relocation costs.**

(a) Relocation costs are costs incident to the permanent change of duty assignment (for an indefinite period or for a stated period, but in either event for not less than 12 months) of an existing employee or upon recruitment of a new employee. The following types of relocation costs are allowable as noted, subjected to paragraphs (b) and (f) below:

- (1) Cost of travel of the employee and members of the immediate family (see 31.205-46) and transportation of the household and personal effects to the new location.
- (2) Cost of finding a new home, such as advance trips by employees and spouses to locate living quarters, and temporary lodging during the transition periods not exceeding separate cumulative totals of 60 days for employees and 45 days for spouses and dependents, including advance trip time.
- (3) Closing costs (i.e., brokerage fees, legal fees, appraisal fees, points, finance charges, etc.) incident to the disposition of actual residence owned by the employee when notified of transfer, except that these costs when added to the costs described in subparagraph (a)(4) below shall not exceed 14 percent of the sales price of the property sold.
- (5) Other necessary and reasonable expenses normally incident to relocation, such as disconnecting and connecting household appliances; automobile registration; driver's license and use taxes; cutting and fitting rugs, draperies, and curtains; forfeited utility fees and deposits; and purchase of insurance against damage to or loss of personal property while in transit.
- (6) Costs incident to acquiring a home in a new location, except that (i) these costs will not be allowable for existing employees or newly recruited employees who, before the relocation, were not homeowners and (ii) the total costs shall not exceed 5 percent of the purchase price of the new home.
- (7) Mortgage interest differential payments, except that these costs are not allowable for existing or newly recruited employees who, before the relocation, were not homeowners and the total payments are limited to an amount determined as follows:
  - (i) The difference between the mortgage interest rates of the old and new residences times the current balance of the old mortgage times 3 years.
  - (ii) When mortgage differential payments are made on a lump sum basis and the employee leaves or is transferred again in less than 3 years, the amount initially recognized shall be proportionately adjusted to reflect payments only for the actual time of the relocation.
- (8) rental differential payments covering situations where relocated employees retain ownership of a vacation home in the old location and rent at the new location. The rented quarters at the new location must be

### 3—Allowability

comparable to those vacated, and the allowable differential payments may not exceed the actual rental costs for the new home, less the fair market rent for the vacated home times 3 years.

(9) Cost of canceling an unexpired lease.

(b) The costs described in paragraph (a) above must also meet the following criteria to be considered allowable:

(1) The move must be for the benefit of the employer.

(2) Reimbursement must be in accordance with an established policy or practice that is consistently followed by the employer and is designed to motivate employees to relocate promptly and economically.

(3) The costs must not otherwise be unallowable under Subpart 31.2.

(4) Amounts to be reimbursed shall not exceed the employee's actual expenses, except that for miscellaneous costs of the type discussed in subparagraph (a)(5) above, a flat amount, not to exceed \$1,000, may be allowed in lieu of actual costs.

(c) The following types of costs are not allowable:

(1) Loss on sale of a home.

(2) costs incident to acquiring a home in a new location as follows:

(i) Real estate brokers fees and commissions.

(ii) Cost of litigation.

(iii) Real and personal property insurance against damage or loss of property.

(iv) Mortgage life insurance.

(v) Owner's title policy insurance when such insurance was not previously carried by the employee on the old residence (however, cost of a mortgage title policy is allowable).

(vi) Property taxes and operating or maintenance costs.

(3) Continuing mortgage principal payments on residence being sold.

(4) Payments for employee income or FICA (social security) taxes incident to reimbursed relocation costs.

(5) Payments for job counseling and placement assistance to employee spouses and dependents who were not employees of the contractor at the old location.

(6) Costs incident to furnishing equity or nonequity loans to employees or making arrangements with lenders for employees to obtain lower-than-market rate mortgage loans.

(d) If relocation costs for an employee have been allowed either as an allocable indirect or direct cost, and the employee resigns within 12 months for reasons within the employee's control, the contractor shall refund or credit the relocation costs to the Government.

(e) Subject to the requirements of paragraphs (a) through (d) above, the costs of family movements and of personnel movements of a special or mass nature are allowable. The cost, however, should be assigned on the basis of work (contracts) or time period benefited.

(f) Relocation costs (both outgoing and return) of employees who are hired for performance on specific contracts or long-term field projects are allowable if—

(1) The term of employment is not less than 12 months;

(2) The employment agreement specifically limits the duration of employment to the time spent on the contract or field project for which the employee is hired;

(3) The employment agreement provides for return relocation to the employee's permanent and principal home immediately prior to the outgoing relocation, or other location of equal or lesser cost; and

(4) The relocation costs are determined under the rules of paragraphs (a) through (d) above. However, the costs to return employees, who are released from employment upon completion of field assignments pursuant to their employment agreements, are not subject to the refund or credit requirement of paragraph (d).

## AUDIT DATA DIALOG

Your boss is upset with a recently received audit report on a Dialog Systems proposal. “It doesn't say anything,” he exclaims! “All that it covers is labor rates and overhead rates. It states that everything else is unsupported.”

You review the history of the audit request and find the following:

- a. The request for audit was sent by first class mail one week before the report need date.
- b. The request stated that your office would provide a technical analysis, but apparently the technical review was never sent.
- c. The request asked for a general audit review of proposal.

**1. What could have been done to ensure a more complete audit report?**

**2. What should be done now?**

## FAST AUDIT

On the following three pages, you will find a request for audit support from a cost/price analyst to an audit manager in the inspector general office and the audit performed by DCAA as a result of the request. The FAST rate support is a one-page letter from the FAST Electronics Chief of Estimating.

**3. Evaluate the request for audit support from the auditor's perspective.**

**4. Evaluate the audit report from the cost/price analysts perspective.**

**5. What recommendations do you have for improvement.**

## MEMORANDUM

TO: Green I. Shade  
Audit Manager  
Office of the Inspector General

FROM: John Dollar  
Cost/Price Analyst  
Contract Management Office

SUBJECT: Request for DCAA Input on Proposed Labor Rates for  
Request for Proposal (RFP): XXX00-X1-R-0015

This is to request that DCAA provide written recommendation regarding the attached escalation rates proposed by FAST Electronics under subject RFP. I have previously talked to (DCAA) regarding escalation on the labor rates at FAST Electronics and received verbal recommendations of no more that 2.5 percent. Contracting Officers have been advised that this is the current DCAA recommendation. FAST, however, takes exception to this and continues to propose a 6.0 percent escalation over last year.

This office cannot determine whether the information submitted by FAST is accurate. Informal review indicates that increases have been running more than 2.5 percent annually. However, whether that escalation is due to actual employee salary increases or a change in the labor mix cannot be analyzed based on the data available to this office.

If you have any questions concerning this matter, please contact me at 555-9999.

ATCH: FAST Methodology and Documentation for Labor Rate Increases

## **FAST ELECTRONICS**

Mr. John Dollar  
Cost/Price Analyst  
Contract Management Office

SUBJECT: Methodology & Documentation for Labor Rate Increases

Dear Mr. Dollar:

It is FAST's Compensation Philosophy to position salaries to better reflect market rates. To accomplish this goal, each year the Compensation Unit conducts an analysis of the labor market to gain insight on competitive rates of pay for FAST positions.

The information is obtained from approximately 10 different salary surveys which contain national, regional, and industry specific compensation data. Generally, 70 percent of the FAST job titles are matched to survey titles. The results of our analysis are available on our X412 report for your review.

Merit increase budget information is collected from the survey sources. Information is collected by pay status (exempt vs. non-exempt) as well as by overall discipline (management, technical, and professional).

The recommendations for 19X1 and 19X2 were 6.0 percent and 6.1 percent respectively. The actual expenditures were 6.2 percent in 19X1 and 6.0 percent in 19X2. For 19X3, the projected increase is 6.0 percent. The actual expenditures will not be available until the calendar year is completed.

In conclusion, the merit increase expenditures for FAST are representative of the labor trends of the industry.

If you should require any additional information, please contact me at 555-9991.

Sincerely,

Mary Mirth  
Chief of Estimating

# OFFICE OF THE INSPECTOR GENERAL

IN REPLY REFER TO  
Audit Report No. XXXX-XXX-XXXX

Subject: Report on Audit of Proposed Escalation Under RFP XXX00-X1-C-0015

To: Mr. John Dollar  
Cost/Price Analyst  
Contract Management Office

## 1. Purpose and Scope of Audit

- a. As requested by your letter, we have audited the FAST proposed labor rates for the subject RFP.
- b. The proposal and related cost or pricing data are the responsibility of the contractor. Our responsibility is to express an opinion on the proposed element based on our audit.
- c. As requested, our audit was limited to an examination of the proposed escalation factors. We conducted our audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the proposal is free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the [proposal. An audit also includes assessing the accounting principles used and significant estimates made by the contractor, as well as evaluating the overall proposal presentation. The cost or pricing requirements and cost principles in the Federal Acquisition Regulation, and pertinent agency supplement and the practices required by applicable Cost Accounting Standards were used as criteria in evaluating the proposed costs. We believe that our audit provides a reasonable basis for our opinion.

## 2. Summary of Audit Results

- a. Our audit disclosed no significant questioned, unsupported or unresolved items which would preclude acceptance of the cost element audited as submitted.
- b. In our opinion, the offeror has submitted adequate cost or pricing data related to the cost element audited. The estimates for those costs have been prepared in accordance with applicable cost accounting standards and appropriate provisions of FAR and pertinent agency supplements. Therefore, we consider the cost or pricing data to be acceptable as a basis for negotiation of a fair and reasonable price for the specific cost element. This statement should not be interpreted to mean that the data for the elements reviewed are necessarily accurate, complete and current in accordance with 41 U.S.C. 254(d), since a postaward review may disclose evidence not now discernible. Nor should the statement be interpreted to mean that the offeror is necessarily in compliance in all respects with applicable cost accounting standards since a final recommendation cannot be made in a preaward evaluation. Instance of noncompliance with the cost accounting standards may be reported during contract performance.

Audit Report No. XXXX-XXX-XXXX

## 3. Disposition of Audit Results

- a. Accounting counsel and any additional audit service which the contracting officer may require are available upon request. Request for audit assistance should be made directly to J. E. Jones, Supervisory Auditor, at Fast Electronics.
- b. As required by FAR 15.808(b), please provide us a record of the negotiations as soon as possible. If no award is made, please so advise.

Defense Contract Audit Agency  
Green I. Shade  
Audit Manager

## **X. PERT EVALUATION REQUEST**

On the following pages you will find a request for technical evaluation of a task proposal under an indefinite quantity task order contract. (The actual proposal is not included in this exercise.)

**6. Identify the strengths of the request.**

**7. Identify the weaknesses of the request.**

**8. Suggest how the weaknesses can be corrected.**

**MEMORANDUM FOR: Mr. X. Pert, Engineering Chief**

**REFERENCE: Service Contract XXX00-0024**

**SUBJECT: Request for Technical Evaluation for Proposal #001**

The Federal Acquisition Regulation (FAR Part 15) discusses the roles and responsibilities of the various Federal personnel involved in the evaluation of contractor cost proposals. Under Part 15, the Contracting Officer is responsible for determining the reasonableness of the final contract price. Nevertheless, Contracting Officers often need advice from technical and professional specialists on various aspects of a contractor's cost proposal, such as proposed:

- Places and periods of performance.
- Procedures and processes.
- Subcontracting out decisions.
- Labor skill mix.
- Number of labor hours.
- Labor loading vs. delivery schedules.
- Tooling, equipment, and facilities.
- Types and quantities of supplies (including any scrap or spoilage factors).

Hence, I am writing to request a technical evaluation of the attached contractor proposal. Please evaluate relevant aspects of the proposal and report your evaluation in writing within ten (10) working days. In the report:

- (1) Separately address each proposed cost element — indicating whether you agree with, or take exception to, the proposed numbers.
- (2) If you take exception to the proposed numbers, provide your own independent estimate (where possible) of the numbers, assuming reasonable economy and efficiency on the part of the contractor.
- (3) Summarize the rationale for your position on each element of cost, providing sufficient details to enable me to present and support the Government position in negotiations with the offeror.

I may ask you to participate in the negotiation of this proposal. In that event, you will have an opportunity to personally present your positions (including supporting data) on proposed costs in discussions with representatives of the offeror.

To further assist in providing you with a thorough understanding of your technical responsibilities and the type of evaluation report expected, I have attached a sample of a typical cost proposal (Attachment 2) and a related technical evaluation report (Attachment 3). Please call me at 555-9999, if you have any questions.

Contracting Officer

Attachments

**(SAMPLE COST PROPOSAL)****Cost-Plus-Fixed-Fee Contract Proposal**

(Study Contract)

## Direct Labor

Principal	120 hours at \$25 per hour =	\$3,000
Senior Consultant	400 hours at \$18 per hour =	\$7,200
Consultant	2,200 hours at \$14 per hour =	\$30,800
Secretary	280 hours at \$ 7 per hour =	<u>\$1,960</u>
Total Direct Labor		\$42,960

Overhead	125% * \$42,960	\$53,700
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Direct Material (various publications required for study)	\$340
-----------------------------------------------------------	-------

Direct Travel (various trips and quantities provided)	\$9,000
-------------------------------------------------------	---------

## Other Direct Costs (details of quantities provided)

Report Reproduction	\$2,000
Long Distance Telephone	<u>\$2,000</u>

Sub-Total	\$110,000
-----------	-----------

## (SAMPLE TECHNICAL EVALUATION REPORT)

### Technical Evaluation Report—Cost Plus Fixed Fee Contract Proposal

I have reviewed the XYZ Company's cost plus fixed fee proposal. The proposal is a twelve-month study effort to determine the feasibility of implementing a Government-wide data collection procedure for award of consultant service contracts in excess of \$10,000.

The detailed review resulted in my determination that the technical aspects of the proposal are acceptable as submitted. Accordingly, we recommend that no cost reductions be made to the proposal as a result of technical review.

Detailed comments supporting our evaluation of each line item of direct costs follows:

Direct Labor	This office has reviewed in detail the functions to be performed by each of the labor categories proposed, and concur in the need for these proposed labor categories. Additionally, we reviewed in detail the hours estimated for individual functions and related categories of labor. Based on this review, the proposed hours by category were also found to be reasonable.
Direct Material	The offeror presented his rationale. This office understands the rationale for needing the list of publications identified in the cost proposal. We found such to be reasonable and recommend acceptance of the proposed publications.
Direct Travel	Each of the proposed trips were explained in relation to their overall benefit to the prospective project. Based on these explanations, we feel the proposed types and quantities of trips to be reasonable and necessary for satisfactory contract performance.
Other Direct Costs	The reproductions are based on printing 50 copies of the final report, estimated to be 200 pages in length. The contractual requirement is to be established at the proposed 50 copies, and we envision a final report in line with the 200 pages proposed. Accordingly, acceptance of the reproduction requirements is recommended as proposed.

Telephone cost estimates are based on 10 long distance calls per month to varying sections of the United States. Based upon discussions concerning the proposed study approach we feel the nature and quantity of the calls to be reasonable, and recommend acceptance to the telephone requirements as proposed.

*Mr. Pert: This sample report may not fit your particular requirement exactly. I have included it to emphasize the depth of the intended review and related report, even for a cost type contract or minor dollar fixed price contract. Telephonic discussions, in lieu of face-to-face meetings, may be adequate depending upon the size and complexity of the prospective procurement.*

*Contracting Officer*

## Vignette

### Text/Reference Page 4-34

*Kay has asked you to help Andrew if he has any questions. After reviewing the proposal, Andrew has come to you with several questions.*

1. *Having reviewed the WEC proposal, are there any specific areas that you would identify in your request for technical input?*
2. *Having reviewed the WEC proposal, are there any specific areas that you would identify in your request for audit input?*
3. *What program history is identified in the proposal?*
4. *If you wanted to see additional information on the program history (old proposals, negation memorandum, technical & audit reports, etc.) where would you look?*

### HOTT HEATER SYSTEMS

HOTT Heater Systems is proposing to build a new improved heater system for Government use. The current proposal is for system design, first article production and testing, and production of 500 units. Government requirements over the next five years are estimated at 5,000 units.

The cost to design, produce, and test the first article of the new model is proposed at twice the cost of the similar effort for the old model. The rationale is that the new model is more complex than the old model. Also, significant problems were encountered during the first article testing on the old model and there is no reason to expect the new model to do any better.

Production costs for the first 500 units are proposed at a lower unit cost than the first 500 units of the old model but at a higher unit cost than the most recent production of the old model. Due to design changes, the new system is expected to be more producible and the company has acquired new computer-aided manufacturing technology. The overall cost is expected to be lower with fewer quality problems and production rejects.

The proposed production schedule extends over 18 months even though the Government would like production completed within one year. Hott has identified legitimate concerns over the availability of critical materials and some schedule delays, due to material shortages, are possible.

- 1. Based on the above, what planning assumptions were made in each of the following areas:**

Anticipated Problems:

Anticipated Technological Change:

Potential Interruptions and Shortages:

- 2. What actions could you take to validate, analyze, and make recommendations on these assumptions?**

**ANALYSIS OF OFFEROR ASSUMPTIONS****3. What are the two basic perspectives concerning the relationship between the current project and the past?**

The future will be \_\_\_\_\_.

The future will be \_\_\_\_\_.

**4. There are three types of contingencies:**

- a. Contingencies that arise from presently known, existing conditions, AND can be reasonably forecasted.
- b. Contingencies arising from conditions presently known or unknown, BUT the effects of which CANNOT be reasonably forecasted.
- c. Contingencies added to historical costs, which are NOT normally allowable.

**Categorize each of the following by type of contingency:**

TYPE	SCENARIO
	The offeror has been advised that chemicals released into the ground on their property 40 years ago are polluting the area's drinking water and that the Environmental Protection Agency will be issuing a cleanup order. The offeror did NOT own the property 40 years ago, but since they are the current owner they will have to clean it up and seek restitution from the previous owner or be sued by the Government for "Super Fund" cleanup costs.
	The historical reject rate for satellite electronic piece parts has run 25%. Therefore, the offeror is proposing to buy 100 parts against an order for 80 parts as a contingency.
	Due to an emergency need, the offeror completed and shipped the product prior to preparing the proposal. The actual hours required to build the product was 152 hours. The company estimating manual requires a 10% usage factor, based on an analysis of actual costs be added to all proposals. Therefore, the offeror is proposing 167.2 hours even though the work only took 152 hours.

### WORK DESIGN ANALYSIS

5. During the course of cost and price analysis, technical personnel recommend that the contractor consider changes in the manufacturing process and in material handling procedures that would result in substantial cost reductions. The use of this analysis technique is known as \_\_\_\_\_.
  
6. In negotiations, the contractor refuses to consider the above recommended changes in their proposed price. What options are available to you as the Government's negotiator?

## **COST RISK ANALYSIS**

- 7. Describe three ways of reducing cost risk?**
  
  
  
  
  
  
  
  
  
  
- 8. When a contractor is hesitant to purchase an expensive machine because the customer will NOT guarantee that they will purchase a sufficient quantity of the product to recoup the investment, what kind of risk is involved?**
  
  
  
  
  
  
  
  
  
  
- 9. When either the contractor or the customer is unsure that the contract can be successfully completed, what kind of risk is involved?**

## Vignette

### Text/Reference Page 5-46

#### CLASSROOM EXERCISE

*Andrew needs help, again.*

- 1. WEC is projecting manufacturing labor and wages based on history. Describe what WEC is assuming about manufacturing cost behavior.*
- 2. WEC is claiming liaison engineering is best represented as a percentage of manufacturing labor. Describe what WEC is assuming about engineering cost behavior.*
- 3. Does WEC use of history recognize should-cost? Explain.*
- 4. A factor to consider under cost risk is contract type. The proposal assumes what contract type? Is this contract type appropriate?*

## FINANCIAL FORECASTERS

1. Financial Forecasters Inc., calculates and projects price indices for exotic products. Your office sometimes uses these indices as a method for running a “reasonableness” check on small dollar evaluations. **Calculate simple price indices for each year using the historical and projected price data given and the following formula:**

$$\text{Price Index for Period X} = \frac{\text{Price in Period X}}{\text{Price in Base Period}} * 100$$

PERIOD	PERIOD PRICE	INDEX BASE 19X3
19X3	\$3,000	
19X4	\$3,150	
19X5	\$2,990	
19X6	\$3,200	106.7
19X7	\$3,295	
19X8	\$3,350	

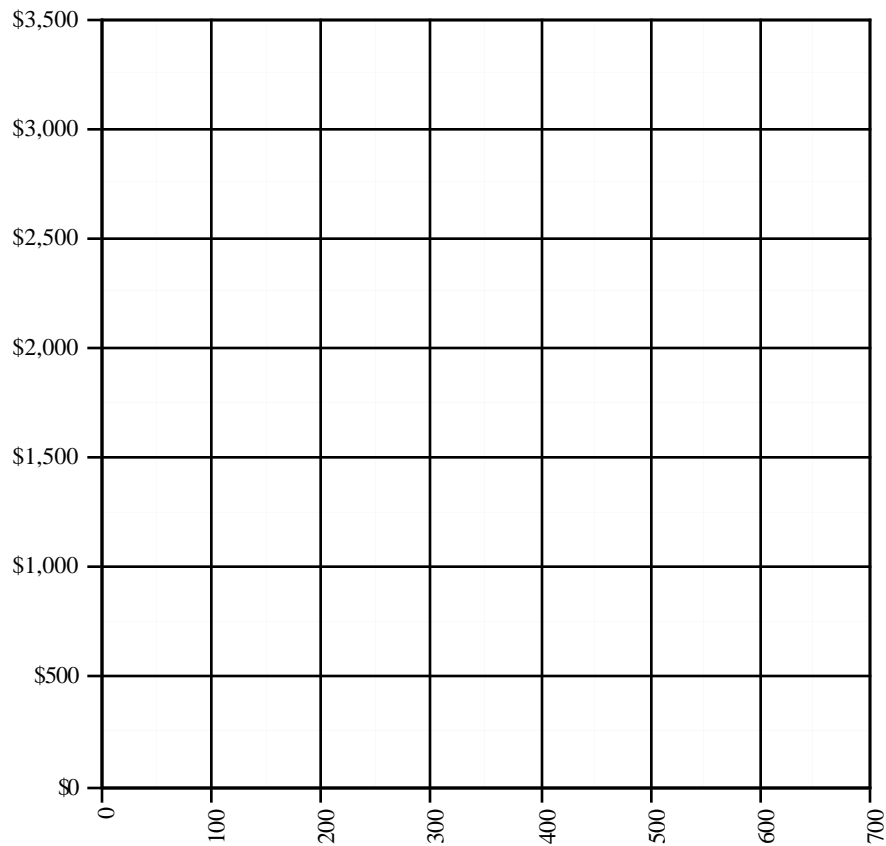
2. Using the index numbers you calculated for base period 19X3, adjust the prices shown below to equivalent prices for the periods indicated.
  - a. Price in 19X4 Dollars = \$1,500.00  
Price estimate for 19X8 = \_\_\_\_\_
  - b. Price in 19X4 Dollars = \$12.50  
Price estimate for 19X5 = \_\_\_\_\_
  - c. Price in 19X6 Dollars = \$225.50  
Price estimate for 19X8 = \_\_\_\_\_
  - d. Price in 19X4 Dollars = \$1,150.00  
Price estimate for 19X6 = \$1,1\_\_\_\_

- 6-2

**CVG INC.**

5. CVG Inc. management has been reviewing the following cost history for one of its major products. Using the data below, they estimate that variable costs are \$ 5.00 per unit and fixed costs are \$500. **Is that a reasonable estimate? Make a graph of the data.**

PRODUCTION VOLUME	TOTAL COST
50 Units	\$ 750
150 Units	\$1,250
400 Units	\$2,500



## 6. Calculate the following costs for each volume of production:

	500 UNITS	1,000 UNITS	2,000 UNITS	4,000 UNITS
Variable Cost per Unit				
Total Variable Cost				
Fixed Cost per Unit				
Total Fixed Cost				
Total Cost per Unit				
Total Cost				

## 7. Current capacity is 4,000 units. CVG estimates that purchase of a new machine can increase production capacity to 8,000 units. Variable costs will be reduced to \$4.75 per unit but total fixed costs will be increased to \$1,000. Calculate the following costs for each volume of production using the new machine:

	500 UNITS	1,000 UNITS	2,000 UNITS	4,000 UNITS
Variable Cost per Unit				
Total Variable Cost				
Fixed Cost per Unit				
Total Fixed Cost				
Total Cost per Unit				
Total Cost				

8. Should CVG buy the new machine if future production requirements are estimated at:

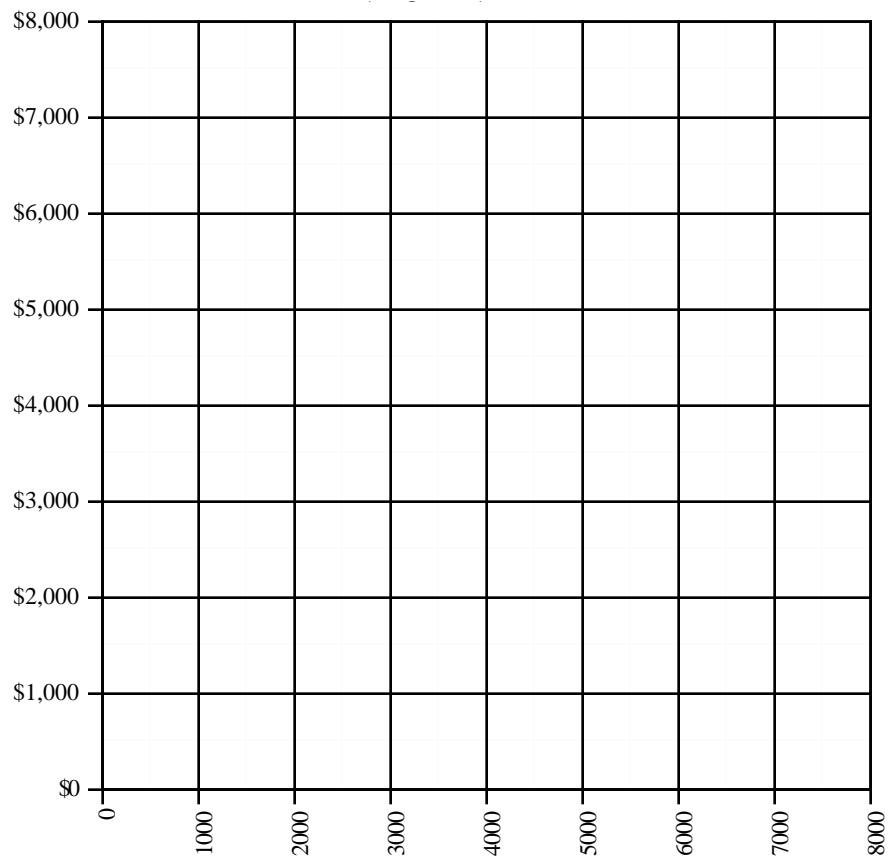
# UNITS	YES/NO	WHY?
7,000		
1,000		
3,000		
2,000		

**BOLD BROTHERS**

Bold Brothers management has collected the following cost data for various production volumes of a company product.

PRODUCTION VOLUME	TOTAL COST
1,000 Units	\$3,000
2,500 Units	\$5,250
3,000 Units	\$6,000
4,000 Units	\$7,500

**9. Is there a linear relationship in the cost data?**



10. What is the general equation of the total cost line for this product?
  
11. Using the general equation developed in Question 29, calculate the total cost to produce:
  - a. One Unit \_\_\_\_\_
  - b. 2,234 Units \_\_\_\_\_
  
12. Given the available cost data, do you believe that the costs calculated in Question 11 are realistic? Why?

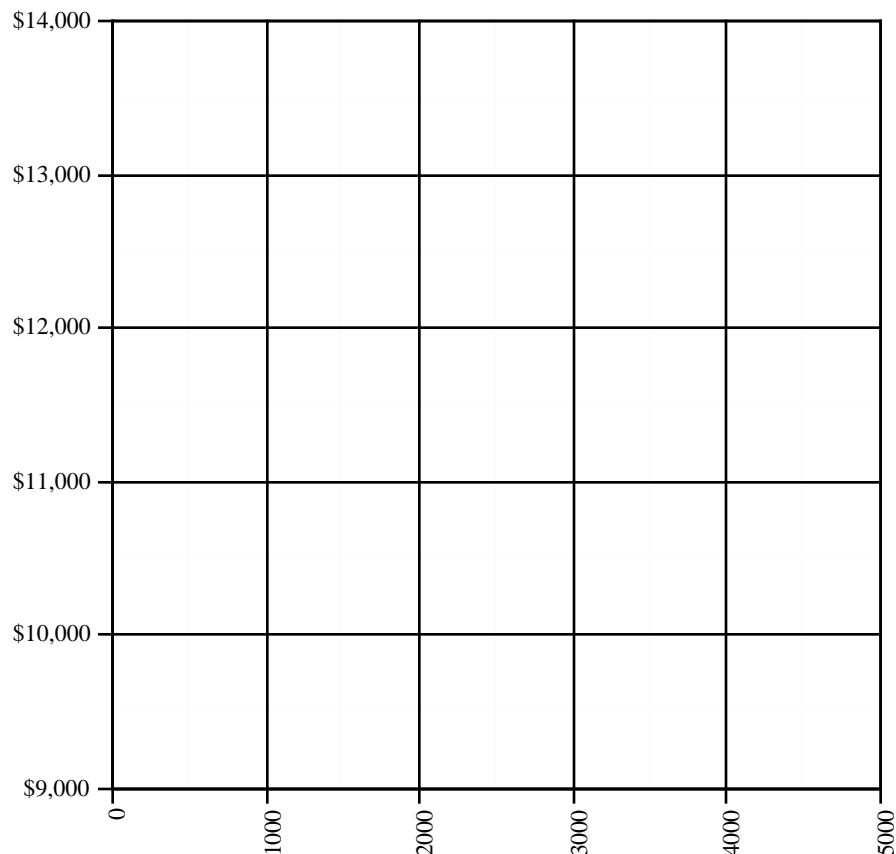
- 6-8

**FLUID SOLUTIONS, INC.**

You are involved in an analysis of the relationship between the cost of exotic chemicals use in the manufacturing process and the volume of production. You have collected production and usage data over the last five years and adjusted it for the effects of inflation.

PRODUCTION UNITS	CHEMICAL COSTS
500	\$10,000
1,000	\$10,200
2,000	\$11,350
3,000	\$12,750
4,000	\$13,200

*Plot the points from the above table onto the graph paper below. DO NOT DRAW A LINE THROUGH THOSE POINTS until you have answered questions 16 and 17 on the next page.*



**16. What is the average of the X values?**

**17. What is the average of the Y values?**

*Go back to page CE 6-9. Plot the point that equals the average of the X values and the average of the Y values. Then try to fit a line through the points, making sure the line touches the point which represents the average X and Y values.*

**18. What is the slope of the line?**

**19. What is the Y intercept value of the line?**

**20. The formula for a straight line is  $Y = A + BX$ . Write out the formula for the line that represents the above data.**

$Y = \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$

**21. What would you estimate to be the cost of chemicals to produce 2,500 units?**

**CIRCUIT BOARD SYSTEMS, INC.**

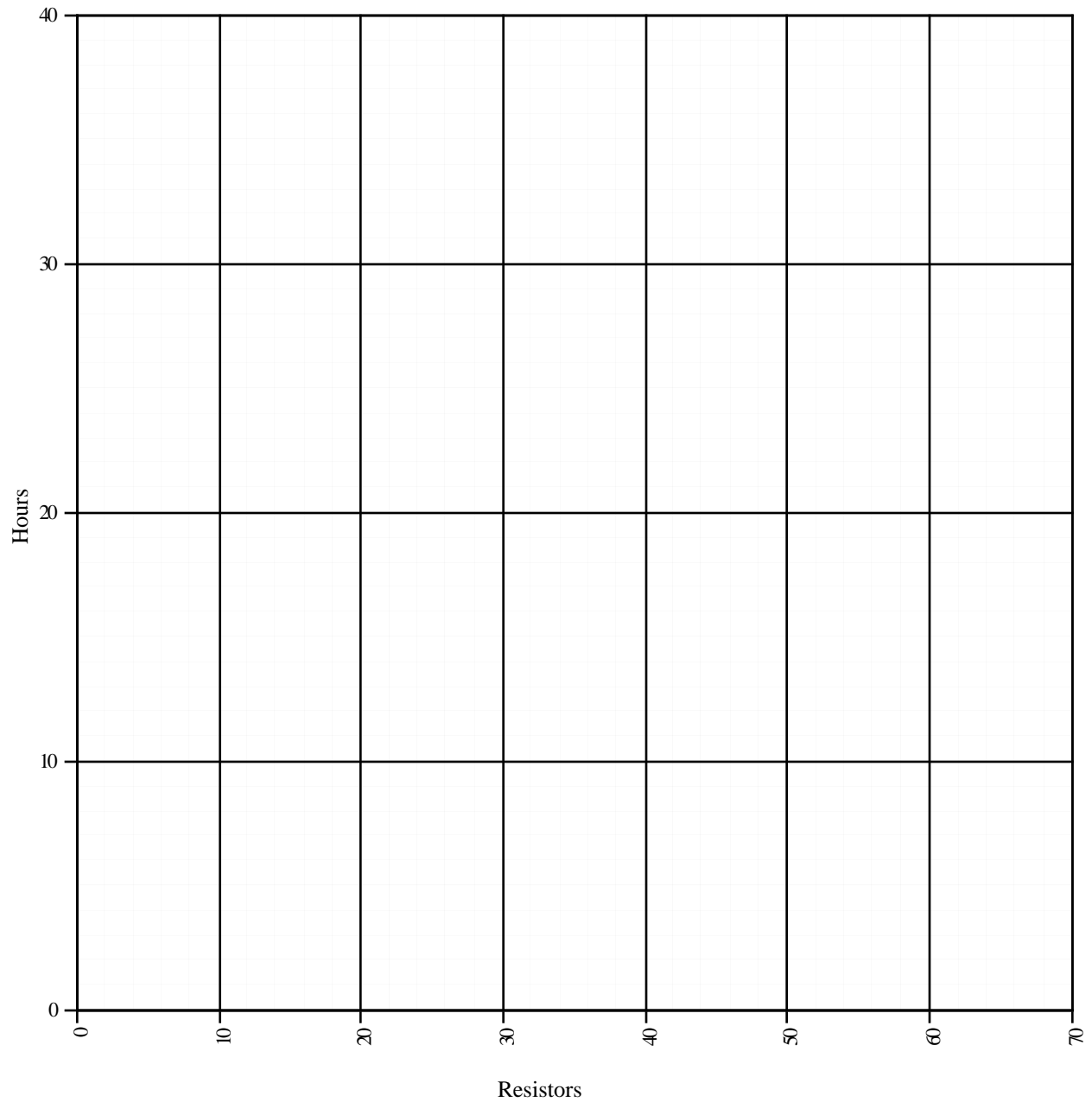
CBS, Inc., is a manufacturer of integrated circuit boards for both Government and commercial applications. The Government has a requirement for spare series SS124 circuit boards. The series SS124 boards have been in production for several years and are commonly used in computerized heavy equipment. The board has previously been produced in three configurations, the -200, -201, and -202. The configuration needed for the current Government requirement is the new -203. While very similar to the other SS124 boards, the -203 has several additional components.

The Director of Purchasing has decided to build a cost estimating relationship to use in evaluation CBS's proposal. From the proposal support, the following data on work hours was collected:

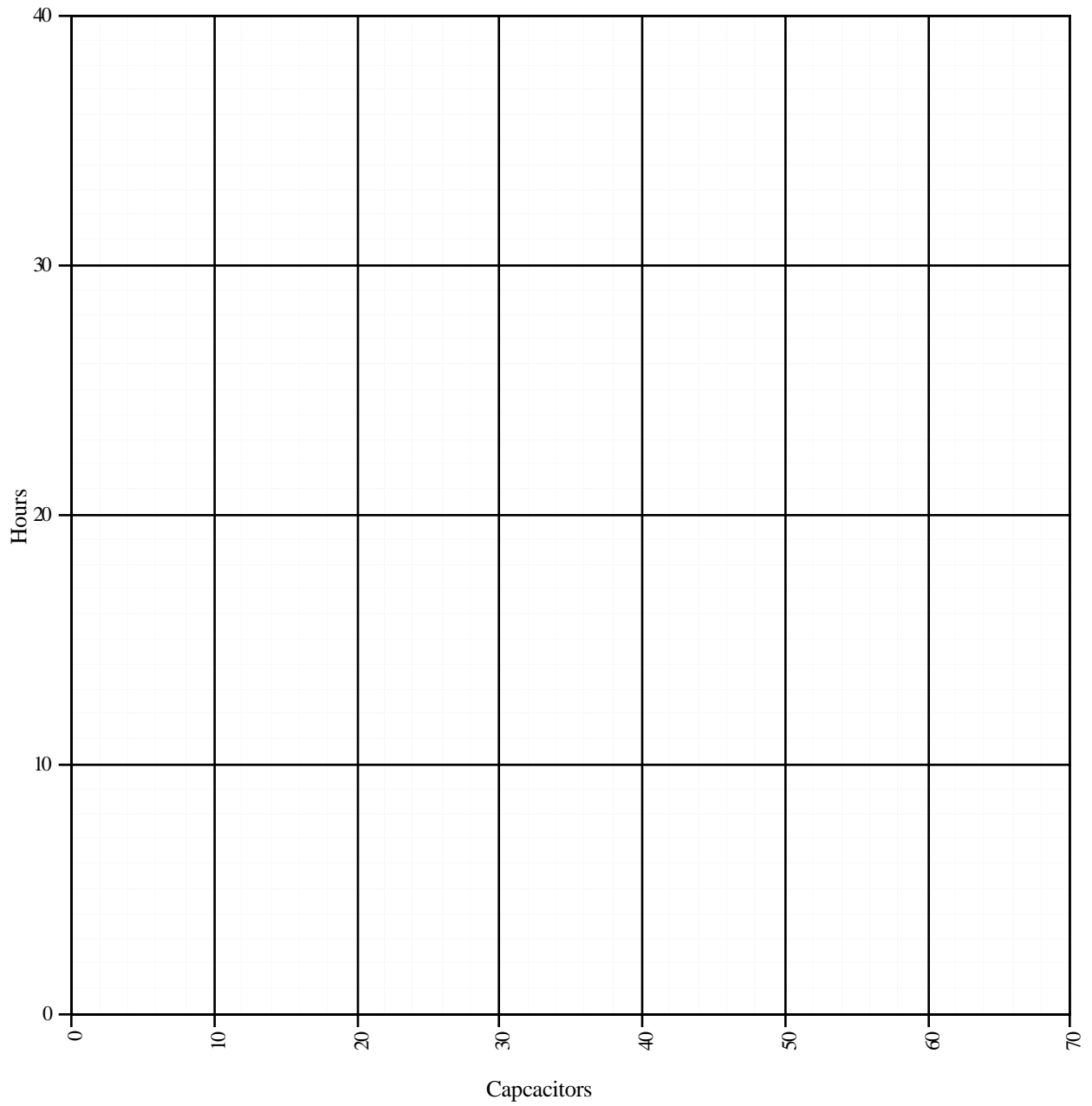
P/N #	LABOR HRS/UNIT	RESISTORS	CAPACITORS	TRANSISTORS	TOTAL PARTS
SS124-200	21	17	14	9	40
SS124-201	36	27	24	19	70
SS124-202	26	23	17	10	50
SS124-203	?	25	20	15	60

- 22. Using one or more graphs, depict the relationship between labor hours per unit and the various physical characteristics of the various circuit boards.**

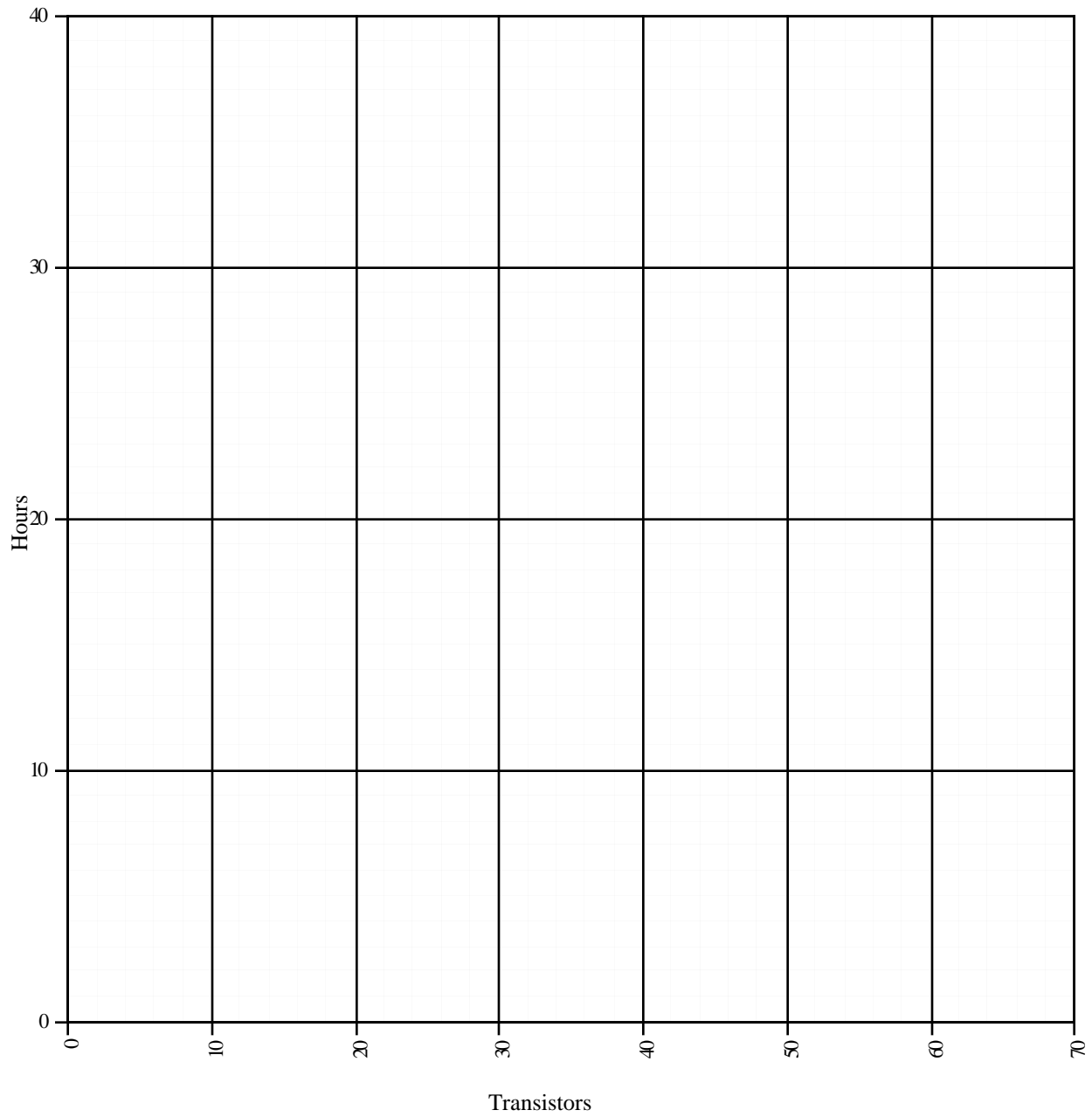
# HOURS VS. RESISTORS



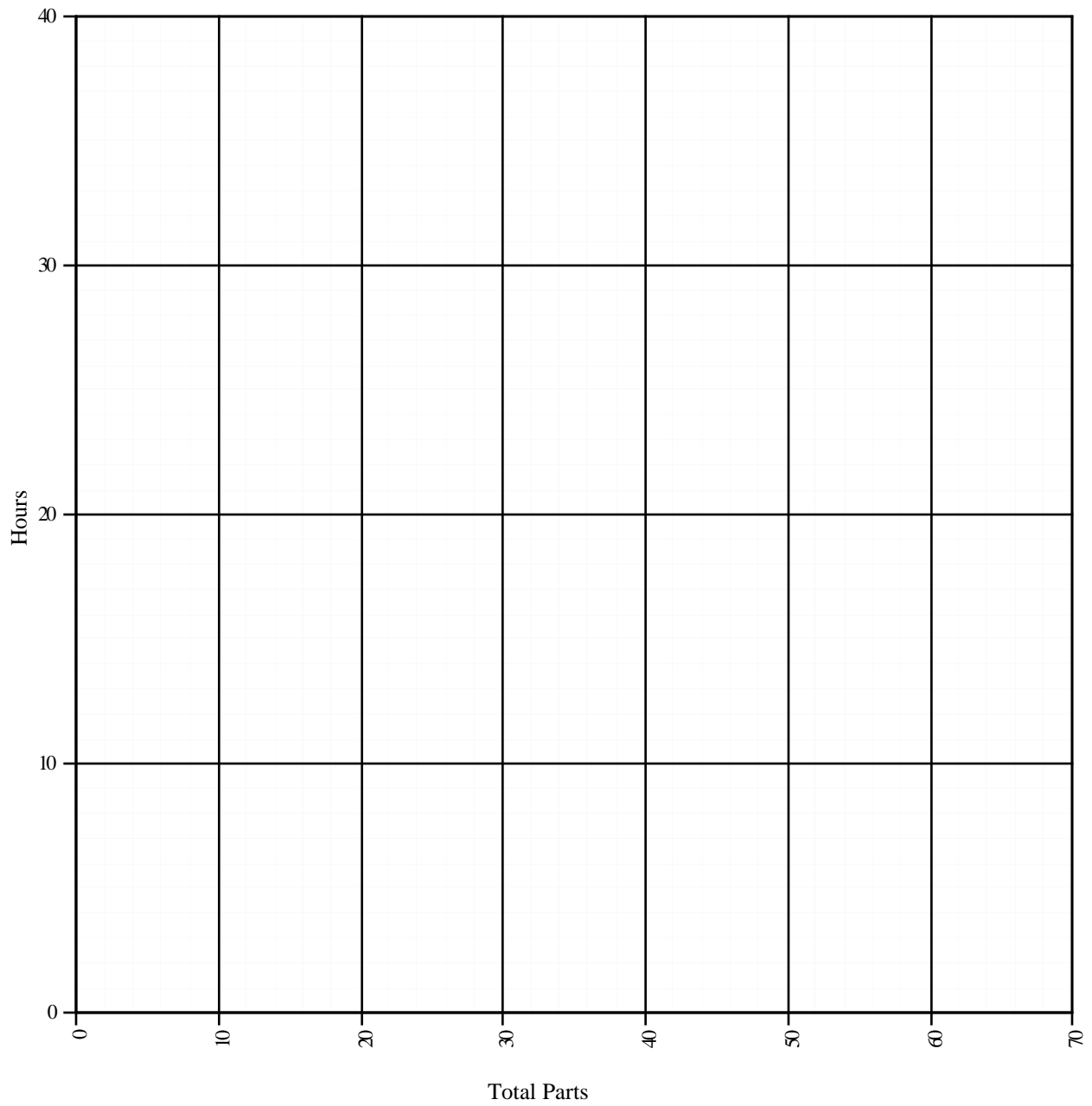
## HOURS VS. CAPACITORS



# HOURS VS. TRANSISTORS



### HOURS VS. TOTAL PARTS



23. Find the “best” parametric cost estimating relationship in the format of a straight-line equation,  $Y = A + BX$ .
  
  
  
  
  
  
  
  
  
  
24. Estimate the number of labor hours per circuit board for the new SS124-203 circuit board.

**SERVICE UNLIMITED**

A question has come up over the cost for operating the Service Unlimited corporate customer relations department responsible for answering telephone inquiries. The contractor feels that the number of calls per month cannot be averaged due to fluctuation in the number of calls from month to month. The contractor feels that payment should be based on 1,245 calls per month since that was the number of calls in the last month of available data and several other months have been around the 1,245 call level.

You have prepared an analysis using the contractor's data that includes a three-month and twelve-month moving average. Based on the contractor's data and rationale, and your analysis, answer the following questions (*see the table and charts on pages CE-6-4 and CE-6-5*).

- 25. Is the contractor's 1,245 call per month position a good representation of the average number of calls per month?**
  
  
  
  
  
  
  
  
  
  
- 26. Based on the data available, are the number of calls increasing, decreasing, or constant?**

**27. Do you agree with the contractor that the number of calls fluctuates too much to use averages to estimate costs? Why?**

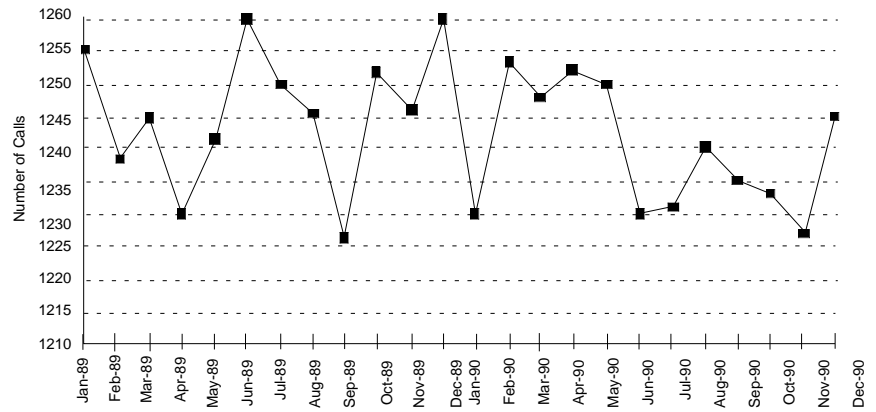
**28. What is a reasonable representation of monthly calls as of December 1990?**

Table showing the number of calls received over a two-year period and the three-month and twelve-month moving averages.

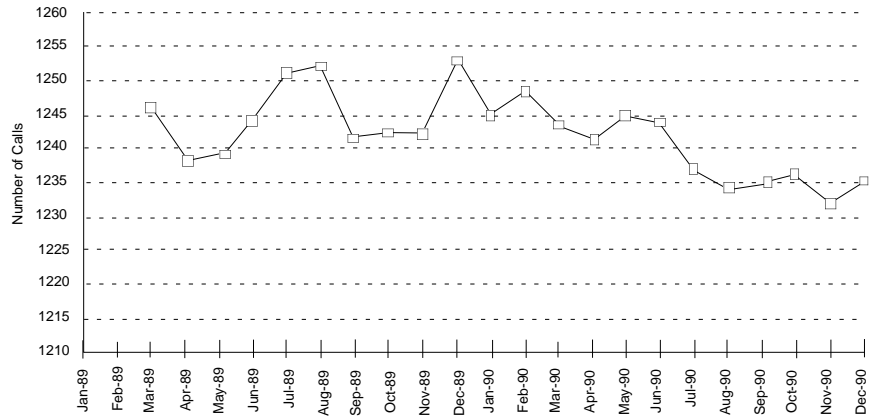
	NUMBER OF CALLS	THREE-MONTH MOVING AVERAGE	TWELVE-MONTH MOVING AVERAGE
Jan-89	1255		
Feb-89	1238		
Mar-89	1245	1246	
Apr-89	1230	1238	
May-89	1242	1239	
Jun-89	1260	1244	
Jul-89	1250	1251	
Aug-89	1246	1252	
Sep-89	1227	1241	
Oct-89	1252	1242	
Nov-89	1246	1242	
Dec-89	1260	1253	1246
Jan-90	1230	1245	1244
Feb-90	1253	1248	1245
Mar-90	1248	1244	1245
Apr-90	1252	1251	1247
May-90	1250	1250	1248
Jun-90	1230	1244	1245
Jul-90	1231	1237	1244
Aug-90	1240	1234	1243
Sep-90	1235	1235	1244
Oct-90	1233	1236	1242
Nov-90	1227	1232	1241
Dec-90	1245	1235	1240

# 6—Estimating/Analysis Techniques

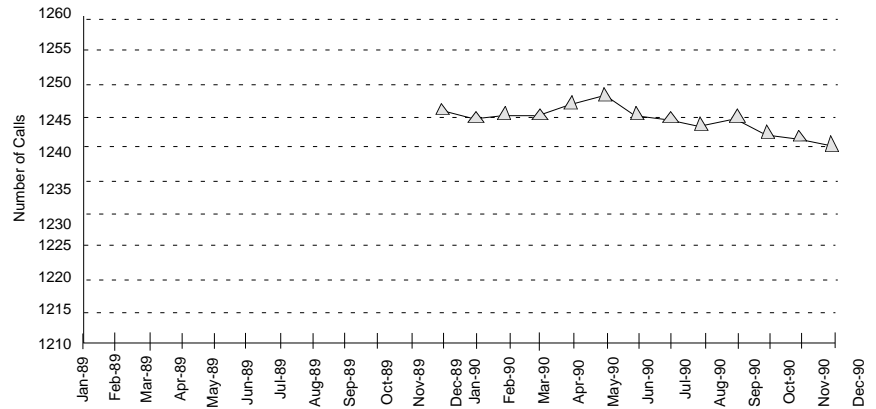
## Calls Received



## Three-Month Moving Average of Calls Received



## Twelve-Month Moving Average of Calls Received



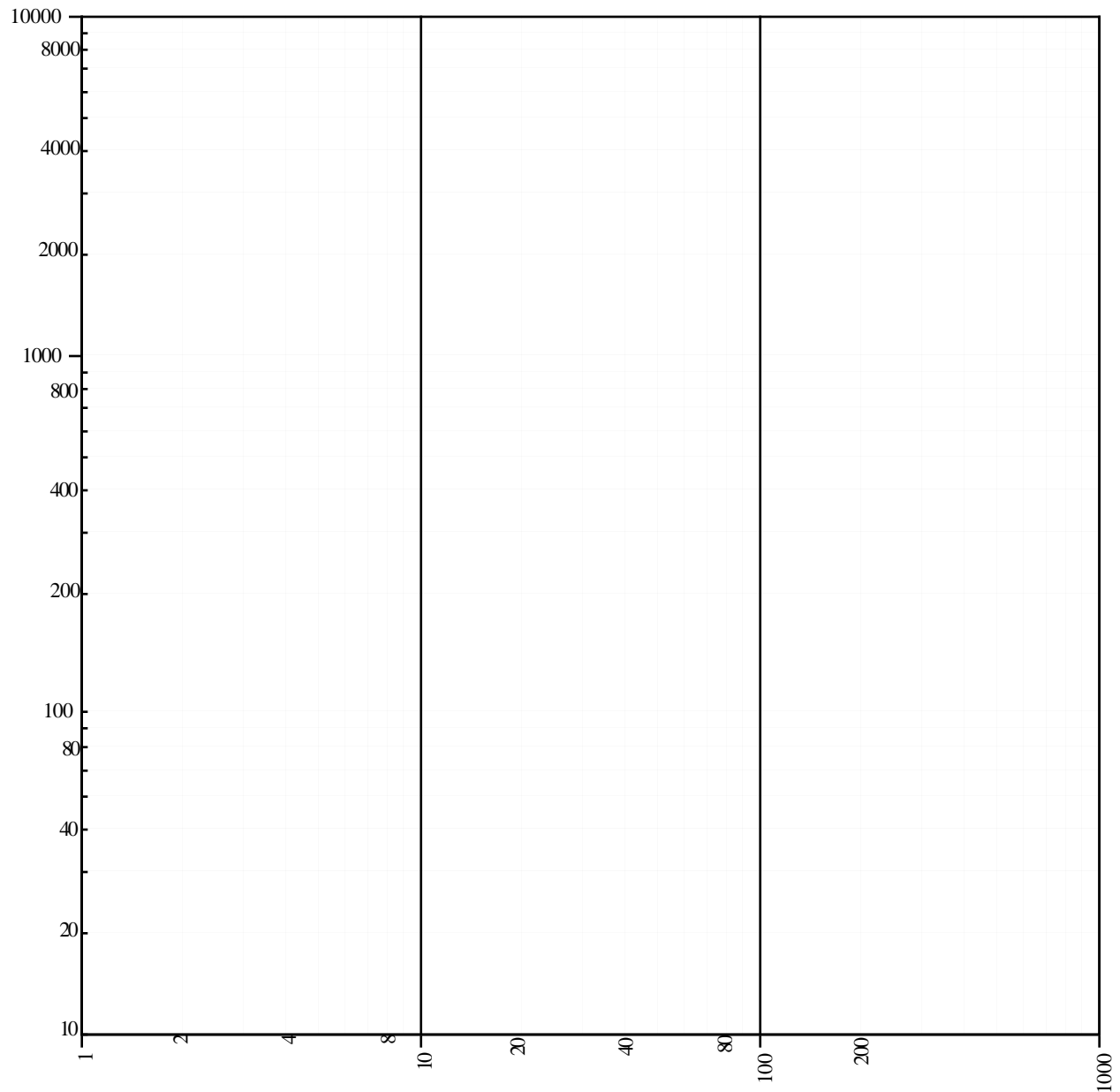
**ATAG IMPROVEMENT**

The Advanced Technologies Assessment Group (ATAG), is evaluating the following labor-hour cost history for a precision approach navigation system.

PRODUCTION UNIT	PRODUCTION LABOR-HOURS
5	1000.0
10	750.0
20	562.5
40	421.9
80	316.4
160	237.3

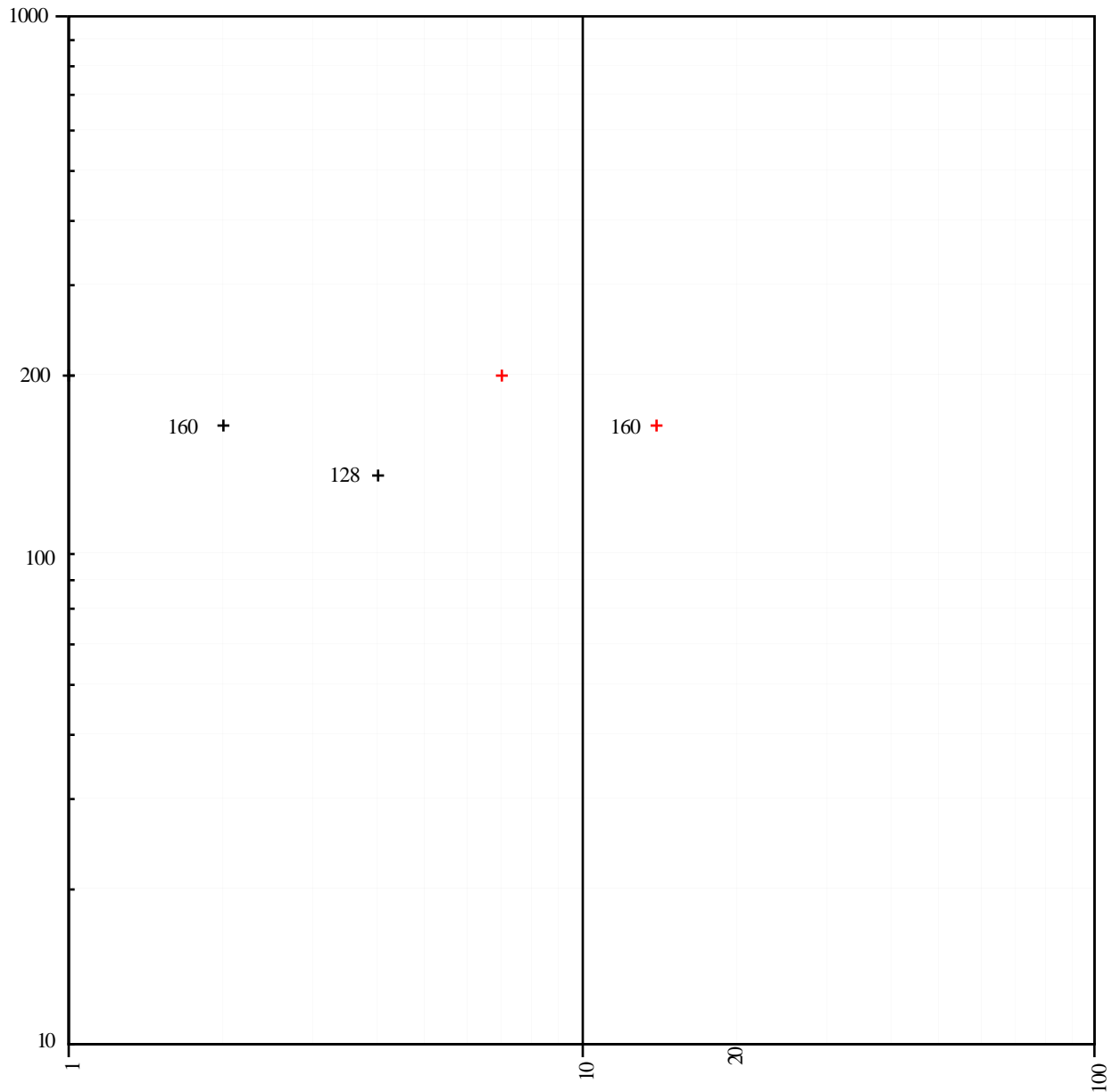
29. a. Graph the data using log-log paper.
- b. Estimate the labor hours required to produce Unit #1.
- c. Estimate the labor hours required to produce Unit #200.

CLASSROOM EXERCISE



30. What is the slope of the improvement curve in Question #29?
  
31. Describe the relationship between improvement curves with the same slope when graphed on log-log paper.

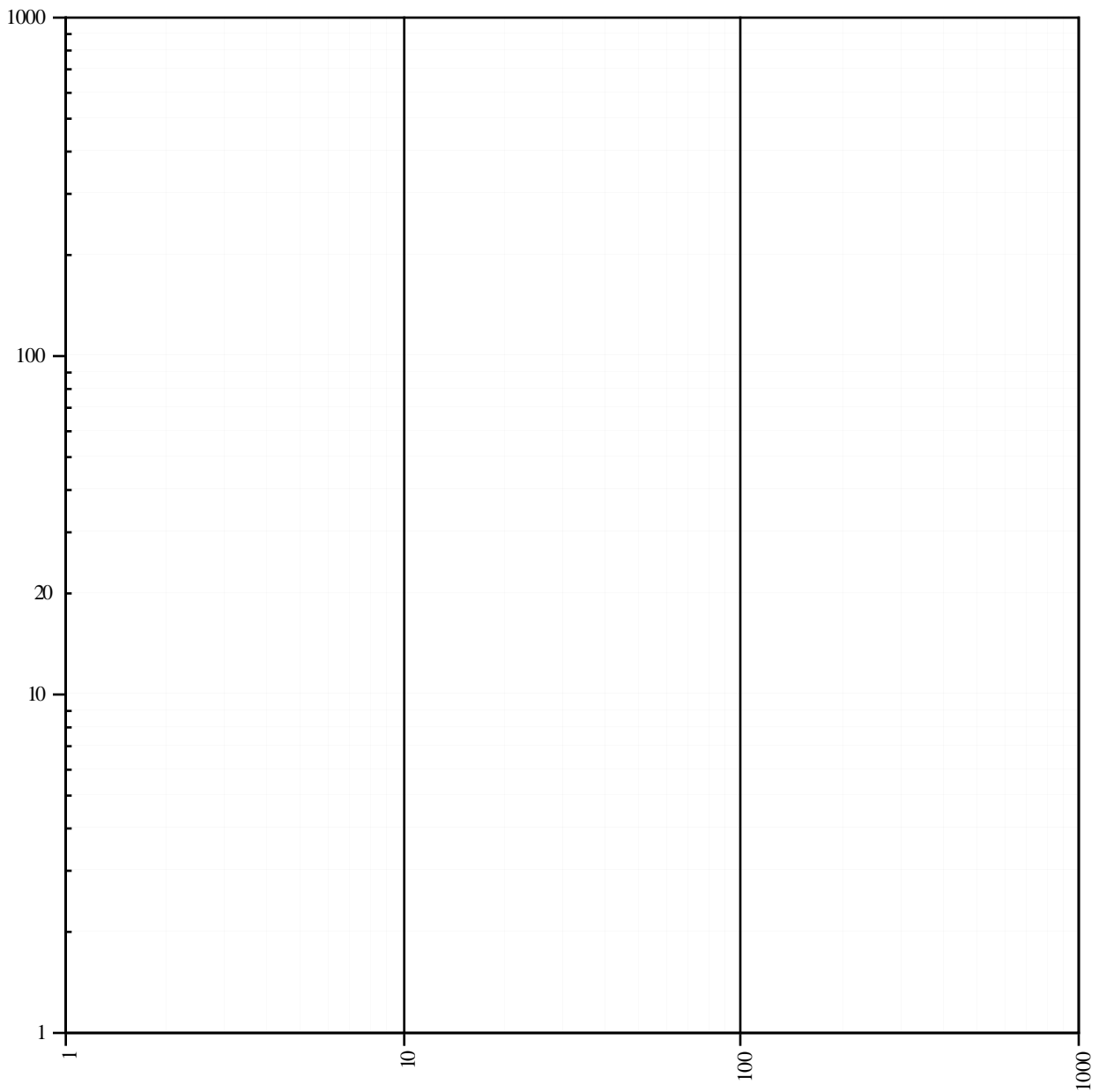
32. a. Draw an improvement curve with an 80% slope and a Unit #1 production effort of 200 hours.
- b. Draw another curve with an 80% slope and a Unit #7 production effort of 200 hours.
- c. Does the relationship between the two curves conform with your answer to Question #31?



The ATAG is also evaluating the following labor-hour cost history for another new precision approach navigation system.

PRODUCTION UNIT	PRODUCTION LABOR-HOURS
3	42
30	30
100	25

33. a. Graph the data using log-log paper.
- b. Estimate the labor hours required to produce Unit #1.
- c. Estimate the labor hours required to produce Unit #250.



CLASSROOM EXERCISE

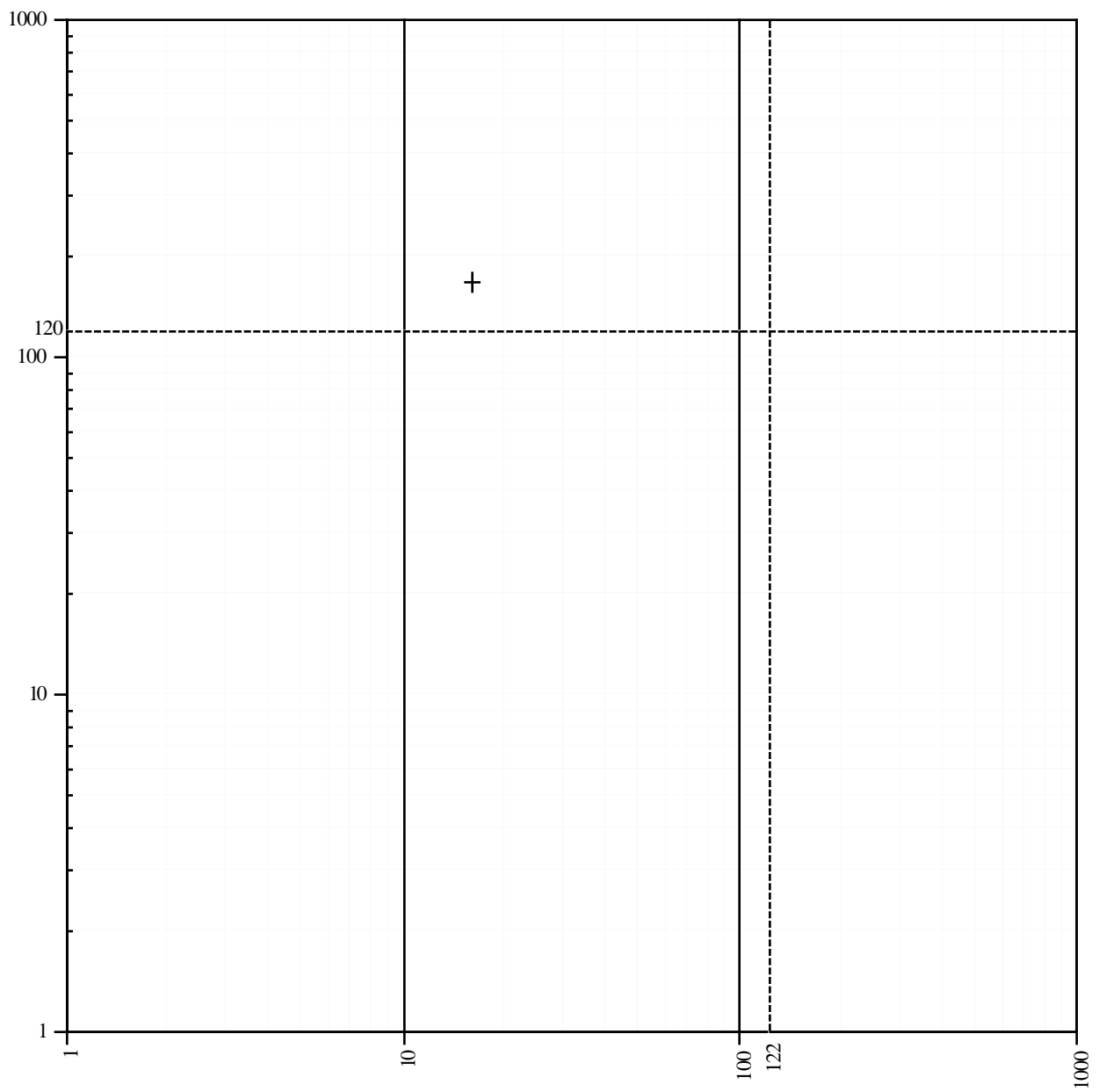
34. **What major assumptions have you made in estimating the labor-hours to produce Unit #250?**
  
  
  
  
  
  
  
  
  
  
35. **What additional information would give added credence to the validity of these assumptions?**

You have been called upon to do the ATAG evaluation of the following contractor labor-hour data:

LOT	SIZE	CUMULATIVE UNITS	LOT MID-POINT	LOT PLOT POINT	LOT UNIT HOURS	TOTAL LOT HOURS
1	8					2312
2	16					2672
3	26	50	13	37	120	3120
4	32					3040
5	80					

36. a. Graph the data using log-log paper.
- b. Estimate the labor hours required to produce Unit #1.
- c. Estimate the slope of the improvement curve.
- d. Estimate the labor hours required to produce Lot #5 of 80 units.

CLASSROOM EXERCISE



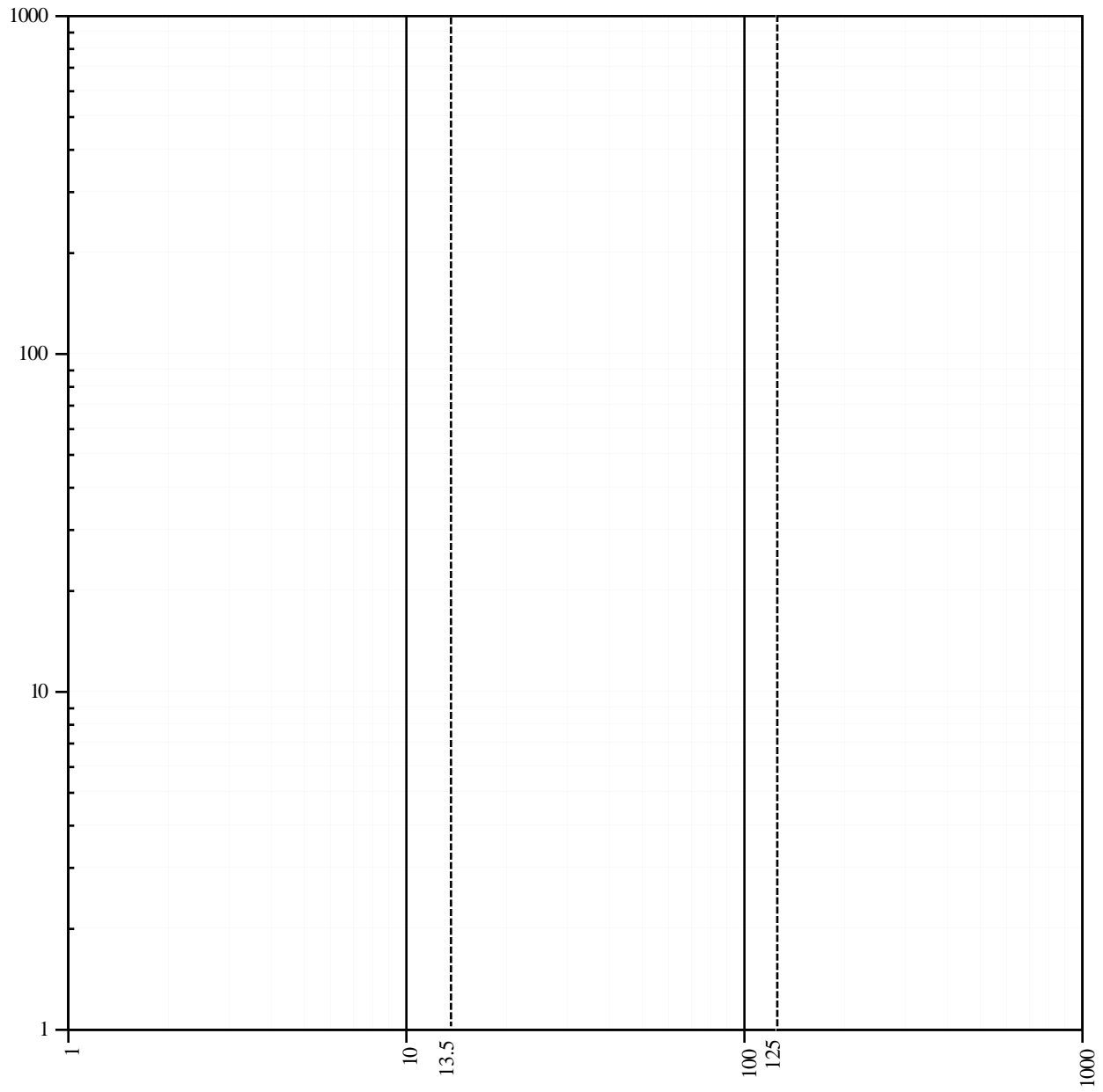
**WILLIAMS IMPROVEMENT**

Williams Corporation recently submitted a proposal for building 200 oscilloscopes to special Government specifications. Williams has already completed production of 150 oscilloscopes and 25 more are currently under production. The proposal included the following direct labor-hour history from previous production:

LOT	SIZE	CUM UNITS	LMP	LPP	LOT UNIT HOURS	TOTAL LOT HOURS
1	8	8	4		100	800
2	11		5.5			770
3	31	50	15.5	34.5	53	1,643
4	50	100				2,100
5	50					1,800
6	25	175	12.5			Incomp
7	200					

37. Using the above data and unit improvement curve theory, predict the total hours required to produce the 200 units of Lot #7.

CLASSROOM EXERCISE



## Vignette

### Text/Reference Page 6-96

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*Andrew is trying to relate the estimating/analysis techniques to the radio proposal.*

*Review the WEC proposal and match the estimating/analysis technique(s) that might be used on this procurement to the cost elements listed. **Note:** NOT every technique may fit this particular proposal.*

ANSWER	COST ELEMENT	CHOICE	TECHNIQUE
	Manufacturing hours	A	Sampling
	Manufacturing labor rates	B	Index numbers
	Engineering hours	C	Cost-Volume-Profit
	Engineering labor rates	D	Line of best fit
	Purchased parts	E	Economic forecasts
	Overheads and G&A	F	Cost estimating relationships
	Total cost	G	Moving averages
		H	Improvement curves

---

CLASSROOM EXERCISE

### DIRECT MATERIAL COST DEFINITION

- 1 . Which of the following material costs are normally found in direct material costs:

MATERIAL COSTS	DIRECT COST?
Raw Materials	
Parts	
Manufacturing Supplies	
Subassemblies	
Office Supplies	
Pan/Bench Stock	
Components	
Outbound Transportation Costs	
Inbound Transportation Costs	
Scrap Material	
Intransit Insurance	

\*or No, depending on accounting system

## FAR-OUT PRODUCTS

2. FAR-OUT Products develops material estimates based on a direct comparison with the material costs on similar projects. Material costs are usually adjusted using a “complexity factor” which subjectively considers relative project differences. **This is an example of what type of estimate?**

You believe that there is a relationship between the labor-hours on past FAR-OUT Products' research and development projects (R&D) and the material required to complete the projects. You are currently involved in analysis of the firm's most recent cost proposal for R&D. You have collected the following data on similar FAR-OUT R&D:

PROJECT	LABOR-HOURS EXPENDED	MATERIAL DOLLARS EXPENDED
1	1,000	\$5,000
2	1,100	\$5,200
3	1,900	\$7,400
4	2,000	\$7,350
5	1,900	\$7,450
TOTAL	7,900	\$32,400

3. a. Based on the above history, develop a cost estimating relationship (CER) that relates material dollars to labor-hours.

- b. Using the relationship that you developed, how much material cost would you estimate is needed for an R&D project expected to require 1,850 engineering hours?

## GREENE CORPORATION

4. The Greene Corporation's historical scrap rate is 6% (Units Required Over Bill of Material Requirements/Bill of Material Units). **Assuming the 6% rate is a reasonable figure, how many components would be required to produce 500 units if the bill of materials called for 5 components per unit of finished product.**

**INVENTORY UNIT COSTS**

5. Given the following inventory data, what would be the inventory value charged to job one (quantity of parts needed is 175) using FIFO, LIFO, and weighted average methods:

RECEIPT DATE	NUMBER OF UNITS	VALUE	EXTENDED VALUE
1/1/X1	100	\$10.00	\$1,000
2/1/X1	50	\$11.00	\$ 550
4/1/X1	75	\$12.00	\$ 900
6/1/X1	150	\$13.00	\$1,950
9/1/X1	75	\$14.00	\$1,050
	450		\$5,450

FIFO \_\_\_\_\_

LIFO \_\_\_\_\_

Weighted Average \_\_\_\_\_

## Chapter 7 Vignette

### Text/Reference Pages 7-44 through 7-46

*Andrew is catching on, but he is now getting into cost elements. He has asked your advice on the following questions:*

- 1. How did the audit and technical reports determine that the small dollar purchased parts were reasonable?*
- 2. The costs proposed for small dollar purchased parts appear to be fair and reasonable based on the audit and technical reports. Is further analysis required? Why?*
- 3. What important issues in pricing purchased parts were not addressed in the audit and technical reports?*

## Chapter 7 Vignette

**Text/Reference Pages 7-44 through 7-46**

4. *Commercial items were priced as catalog priced items. Should Sooper Antenna be granted a waiver of the requirement for cost or pricing data? Why?*

5. *Does granting Sooper Antenna a waiver require you to accept the proposed price?*

6. *Develop a cost estimating relationship (CER) using the antenna data in the technical report. Using the CER, what is your estimate of a reasonable price?*

## Chapter 7 Vignette

Text/Reference Pages 7-44 through 7-46

*Direct Material Summary Table*

MATERIAL COST	PROP	AUDIT	TECH. REPORT	ACO REPORT	YOUR OBJECTIVE
Purchased Parts*					
Sooper Antenna*					
Scrap & Usage Rate					

*\*Do NOT include scrap cost in material estimate.*

**Rationale for position on purchased parts:**

**Rationale for position on Sooper Antenna**

**Rational for position on scrap and usage:**

## **Chapter 7 Vignette**

**Text/Reference Pages 7-44 through 7-46**

### **CLASSROOM EXERCISE**

## DIRECT LABOR COST DEFINITION

Direct labor can represent many different types of effort. The labor classifications and descriptions below represent some of the major labor classifications.

### 1. Match the following labor classifications and descriptions:

ANSWER	CLASSIFICATION	CHOICE	DESCRIPTION
	Design Engineering	A	Involves the fashioning of parts from raw or purchased materials
	Manufacturing Engineering	B	Involves delineating the end product's characteristics and specifications
	Reliability & Maintainability Engineering	C	Involves manufacturing planning, process instructions & work methods, shop loading, organizing work stations, and matching shop capabilities to contractual requirements
	Quality Assurance Engineering	D	Involves the act of testing or inspecting the product during the manufacturing process
	Sustaining Engineering	E	Involves designing and manufacturing products to meet longevity and repair requirements
	Fabrication Labor	F	Involves the formulation of standard and specifications for tests and inspections
	Assembly Labor	G	Involves "as needed" support as problems arise throughout the life of the contract
	Quality Control Labor	H	Involves the effort to combine parts into subassemblies and assemblies

## O'SHEA ENTERPRISES

2. During your analysis of the labor hours proposed to produce 50 units of the OMP-1984, you find that O'Shea Enterprises has experienced an improvement curve rate of 80 percent in assembly operations over the two years of continuous production. A total of 550 units have been produced. The last complete lot averaged 90 assembly labor-hours per unit.

However, O'Shea Enterprises has not used improvement curve theory in estimating the assembly labor-hours required to produce the 50 units of the proposed contract. Instead the proposal describes the O'Shea's efforts in automation. As part of a new investment program, the O'Shea will automate OMP-1984 assembly. Because of the automation, assembly labor-hour requirements per unit are expected to remain relatively constant. The assembly labor-hour estimate for the proposed production totals 5,500 hours.

- a. Does the O'Shea labor-hour estimate appear reasonable? Why?

- b. What additional information would be useful in your analysis?

3. O'Shea uses labor standards to estimate the labor-hours required for certain repetitive fabrication operations. The labor standard for one fabrication task is 1.75 hours and the realization factor is 3.5. **How many labor hours would be required to produce 50 units?**

4. O'Shea has estimated manufacturing labor cost using three different categories of manufacturing labor. Using the data below, calculate plant-wide weighted average manufacturing labor rates for the current year (YEAR ONE) and each of the projected years (YEAR TWO and YEAR THREE). (Note: labor hours per year are based on 52 weeks times 40 hours per week less paid absence which is charged to overhead: 2,080 hours less 180 hours = 1,900 work hours per year)

CATEGORY	NUMBER OF WORKERS	HRS/YR PER WORKER	TOTAL HRS/YR	RATE BY CATEGORY	SUBTOTAL	WEIGHTED AVERAGE RATE
YEAR ONE						
A	200	1,900		\$18.23		
B	250	1,900		\$14.50		
C	300	1,900		\$10.25		
Total/Rate						
YEAR TWO						
A	200	1,900		\$19.14		
B	250	1,900		\$15.23		
C	300	1,900		\$10.76		
Total/Rate						
YEAR THREE						
A	200	1,900		\$19.14		
B	250	1,900		\$15.23		
C	250	1,900		\$10.76		
Total/Rate						

- a. What caused the increase in the weighted average labor rate from year one to year two?



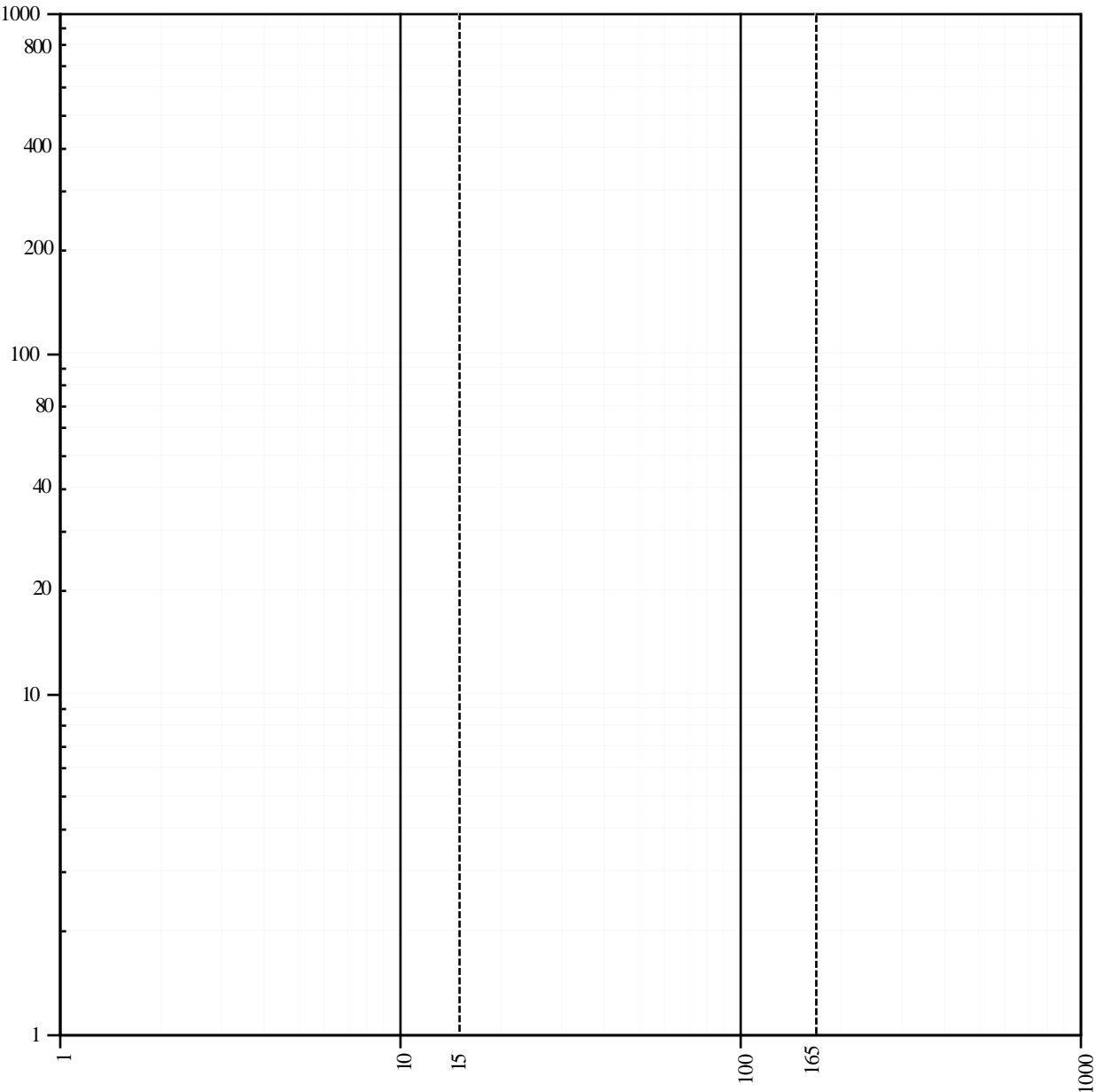
## Chapter 8 Vignette

### Text/Reference Pages 8-53 through 8-56

*Andrew is really confused on manufacturing and engineering labor. REMEMBER! Kay asked you to help out the new guy, and she's the boss!*

- 1. The manufacturing labor hour history appears to demonstrate an improvement trend. Is it reasonable to apply improvement curve theory to manufacturing labor? Why?*
- 2. Is it reasonable for the technical report to apply should-cost analysis to fabrication labor? Why?*
- 3. What are the actual assembly labor hours per unit for each of the first four lots?*
- 4. Using the improvement curve, what assembly hours per unit and total assembly hours would you project for lot 6?*

**Chapter 8 Vignette**  
**Text/Reference Pages 8-53 through 8-56**



CLASSROOM EXERCISE

## Chapter 8 Vignette

Text/Reference Pages 8-53 through 8-56

5. *Which set of labor rates would you use in preparing your objective (proposal, audit, FPRA)? Why?*
  
  
  
  
  
  
  
  
  
  
6. *WEC proposed engineering labor using a percentage of manufacturing hours and a wage rate based on an estimate of the need to raise wages to attract qualified personnel. What are the bases of the audit and technical exceptions to this proposal?*
  
  
  
  
  
  
  
  
  
  
7. *The technical report recommended -0- hour in 19X8. What is the basis of this recommendation? Is it reasonable?*

## Chapter 8 Vignette

### Text/Reference Pages 8-53 through 8-56

*Direct Labor Summary Table*

LABOR COST	PROP	AUDIT	TECH. REPORT	ACO REPORT	YOUR OBJECTIVE
Mfg Hours 19X8	24,500	24,500	23,030	23,030	
Mfg Hours 19X9	25,500	25,500	23,970	23,970	
Mfg Wage Rate 19X8	\$10.00	\$9.80	N/A	\$9.40	
Mfg Wage Rate 19X9	\$10.00	\$10.20	N/A	\$10.11	
Eng Hours 19X8	2,817.5	2,818	-0-	-0-	
Eng Hours 19X9	2,932.5	2,932	3,290	3,290	
Eng Wage Rate 19X8	\$19.76	\$18.68	N/A	\$18.65	
Eng Wage Rate 19X9	\$19.76	\$19.80	N/A	\$20.10	

**Rationale for position on Mfg hours:**

**Rationale for position on Mfg wage rates**

## **Chapter 8 Vignette**

**Text/Reference Pages 8-53 through 8-56**

**Rational for position on Eng hours:**

**Rational for position on Eng wage rates:**

## Other Direct Costs

## CHAPTER 9

### Vignette Text/Reference Page 9-28

*Now, this should be an easy one! Too bad everything Andrew brings to you isn't like this*

- 1. Does WEC's proposed cost for field quality inspections appear to be properly classified as an Other Direct Cost? Why?*
- 2. WEC has agreed that the proposed field quality inspection costs were a mistake and should be removed from the proposal. If the mistake had not been discovered and the cost left in, could this have resulted in defective pricing (see Chapter 2)? Why?*

CLASSROOM EXERCISE

## INDIRECT COST DEFINITION

- 1 . One of the most important aspects of indirect cost analysis is understanding the key terms involved. **Match the following terms and descriptions:**

ANSWER	TERM	CHOICE	DESCRIPTION
	Direct Cost	A	Cost associated with a final cost objective, but insignificant in nature or value. These costs may be included in overhead
	Indirect Cost	B	A logical grouping of indirect costs that bear the same or similar relationship to a category of cost objectives
	Minor Direct Cost	C	A significant cost specifically identified with a final cost objective
	Pool	D	The distribution of indirect cost in proportion to the beneficial or causal relationship of the indirect cost to the direct activities to be burdened
	Base	E	The result of dividing an indirect cost pool by an allocation base
	Rate	F	A direct cost grouping that is representative of the breath of activities supported by a pool of indirect costs
	Allocation	G	Costs not readily identifiable to a specific cost objective or incurred for the benefit of more than one cost objective

**2. Which of the following best describes the cost behavior of indirect costs:**

- a. Variable
- b. Fixed
- c. Semivariable
- d. All of the above

## FLASH INDUSTRIES

Flash Industries, a small business firm, produces raincoats and overcoats for commercial sale and for the Government. Most items are manufactured for specific customer orders. At the beginning of the year, the comptroller estimated costs and production hours for operations throughout the year, as follows:

	DEPT A	DEPT B	PLANT TOTAL
DIRECT MATERIAL COST	\$338,000	\$23,500	\$361,500
DIRECT LABOR COST	\$318,000	\$110,000	\$430,000
FACTORY OVERHEAD COST	\$276,000	\$480,000	\$756,000
DIRECT LABOR HOURS	30,000	10,000	40,000
MACHINE HOURS	2,000	40,000	42,000

3. As part of the planning process, forward pricing rates are calculated using the above data. **Calculate each of the rates listed below.** *In overhead rate calculation, be sure to use the correct base.*

RATE	Dept A	Dept B
Direct Labor:	_____ per hour	_____ per hour
Factory Overhead:	_____ per Direct Labor Hour	_____ per Machine Hour

- 4 . During the year, Job #123, a firm fixed-price Government contract for production of 3,000 raincoats, was started and completed. The contract price was based on the rates developed above and the information below. **Calculate contract costs using the following data and the Job Cost Summary table, below:**

Materials cost totaled \$3,200 for Department A and \$740 for Department B.

Direct labor hours totaled 240 for Department A and 80 for Department B.

Machine hours totaled 120 for Department A and 300 for Department B.

Job Cost Summary  
JOB # 123 (Proposed / Negotiated)

COST ELEMENT	DEPT A	DEPT B	TOTAL
Direct Material			
Direct Labor			
Factory Overhead			
Total Cost			

5. At the end of the year, the Comptroller accumulated the actual costs and hours incurred by Department A and Department B during the year. Actual labor hours and actual machine hours for both departments were the same as the totals negotiated for contracts during the year.

	DEPT A	DEPT B	TOTAL
Direct Material Cost	\$337,000	\$25,000	\$362,000
Direct Labor Cost	\$360,400	\$99,000	\$459,400
Factory Overhead Cost	\$299,000	\$495,000	\$794,200
Direct Labor Hours	34,000	9,000	43,000
Machine Hours	1,900	41,000	42,900

**Compute the overapplied or underapplied factory overhead for Department A and Department B.**

FACTORY OVERHEAD	DEPT A	DEPT B	TOTAL
Applied			
Actual			
Overapplied or (Underapplied)			

6. What would Flash Industries final factory overhead rates be?

Dept A: \_\_\_\_\_ per Direct Labor Hour

Dept B: \_\_\_\_\_ per Machine Hour

- 7. Given the actual costs stated above, what would be the final cost of Job #123 assuming direct costs were the same as proposed and negotiated?**

Job Cost Summary  
JOB #123 (Actual)

COST ELEMENT	DEPT A	DEPT B	TOTAL
Direct Material			
Direct Labor			
Factory Overhead			
Total Cost			

- 8. How did changes in the overhead rates affect profit on Job #123?**

## Chapter 10 Vignette

**Text/Reference Pages 10-48 through 10-52**

*Now Andrew is REALLY confused!*

1. The WEC proposed rates are based on trend analysis of past proposed rates. Is this approach reasonable? Why?

2. The auditors based their analysis on the final rates for the completed cost accounting periods. Is this reasonable?

3. *The ACO report identifies a negotiated Forward Pricing Rate Agreement. What are the contractor's responsibilities under the agreement? ...the Government's responsibilities?*

4. *If you feel the FPRR rates are inaccurate, incorrect, or your negotiation may cause a change in rates, what should you do?*

## **Chapter 10 Vignette**

**Text/Reference Pages 10-48 through 10-52**

5. *The ACO report stated that the change in the engineering overhead rates and the 19X9 manufacturing rate was due to changes in the associated direct labor rates. How can labor rates affect overhead rates?*

## Chapter 10 Vignette

### Text/Reference Pages 10-48 through 10-52

7. Complete the tables on this and the next page:

RATE AND YEAR	PROPOSED	AUDIT	FPRA
Material - 19X8			
Material - 19X9			
Engineering - 19X8			
Engineering - 19X9			
Manufacturing - 19X8			
Manufacturing - 19X9			
G&A - 19X8			
G&A - 19X9			

MATERIAL OVERHEAD	19X8	19X9	TOTAL
Direct Materials Cost Obj. <sup>1</sup>			
FPRA For Materials			
Prenegotiation Objective (\$)			

ENGINEERING OVERHEAD	19X8	19X9	TOTAL
Direct Eng. Labor Cost Obj.			
FPRA for Engineering			
Prenegotiation Objective (\$)			

<sup>1</sup>Enter in 19X8 40% of the dollar amount for the two year total, per ME-26. Enter in 19X9 60%. DO NOT use this formula in any other table.

## Chapter 10 Vignette

Text/Reference Pages 10-48 through 10-52

MANUFACTURING OVERHEAD	19X8	19X9	TOTAL
Direct Manu. Labor Cost Obj.			
FPRA for Manufacturing			
Prenegotiation Objective (\$)			

G&A		
COST ELEMENT	19X8	19X9
Manufacturing Labor		
Manufacturing Overhead		
Engineering Labor		
Engineering Overhead		
Material Costs		
Material Overhead		
Other Direct Cost		
<b>TOTAL MANUFACTURING COSTS</b>		
G&A FPRA Rate		
G&A Prenegotiation Objective (\$)		

# Facilities Capital Cost of Money

## CHAPTER 11

### Vignette

Text/Reference Page 11-22

*Andrew is starting to understand what an imputed cost is, but the five digit factors are throwing him. Give him a hand.*

*In order to develop cost of money factors, you need a net book value (NBV) figure by overhead pool and an overhead base value. In WEC, the NBV's are not an issue. Therefore, the differences in factors are due to different base values. Using the base values in the proposal, audit report, and ACO report, calculate the 19X9 cost of money (COM) factors for engineering.*

	NBV	COST OF MONEY @ 8%	OVERHEAD BASE	COM FACTOR
Proposed	\$2,650,000	\$212,000	\$5,600,000	.03786 <sup>1</sup>
Audit	\$2,650,000	\$212,000	\$6,100,000	.03475
FPRA	\$2,650,000	\$212,000	\$5,978,000	.03546

<sup>1</sup>NOTE: The proposed rate should have been .03786 rounded to five decimal places.

CLASSROOM EXERCISE

## Vignette

**Text/Reference Pages 12-38 through 12-40**

*As the office's leading authority on profit, you can surely help Andrew out on this one!*

*Use the NASA Form 634, Structured Approach Profit/Fee Objective, to develop a profit position (see next page). In addition to completing the NASA Form 634, develop a brief written rationale for your assigned weights. You may find Appendix 1 to the audit report helpful in completing "other factors."*

COST CATEGORY	RATIONALE FOR ASSIGNED WEIGHT
Material Acquisition	
Direct Labor	
Overhead	
Other Costs	
General Management	
Cost Risk	
Investment	
Performance	
Socio-Economic Programs	
Special Situations	

NASA		Structured Approach		
		Profit/Fee Objective		
Contractor		RFP/Contract No.		
Business Unit		Contract Type		
Address		<i>Firm Fixed Price</i>		
Contractor Effort				
1. Cost Category	Government's Cost Objective (a)	Weight Range (b)	Assigned Weight (c)	Weighted Profit/Fee ((a) X (c)) (d)
Material Acquisition		1% TO 4%		
<i>Purchased Parts</i>				
<i>Commercial Items</i>				
Direct Labor		4% TO 12%		
<i>Manufacturing</i>				
<i>Engineering</i>				
Overhead		3% TO 8%		
<i>Manufacturing</i>				
<i>Engineering</i>				
<i>Materials</i>				
Other Costs		1% TO 3%		
General Management (G&A)		4% TO 8%		
1A. Total				
OTHER FACTORS				
FACTOR	Measurement Base (a)	Weight Range (b)	Assigned Weight (c)	Weighted Profit/Fee 1.A((a) X (c)) (d)
Cost Risk	Total Cost Objective 1.A (a)	0% TO 7%		
Investment		-2% TO +2%		
Performance		-1% TO +1%		
Socio-Economic Programs		-.5% TO +.5%		
Special Situations				
2A. Total Other Factors				
3. Subtotal Profit/Fee Lines (1.A) + (2.A)				
4. Less Facilities Cost Of Capital				-
5. Total Profit/Fee Objective Line (3) - (4)				

### WRENCH WITCH

You are purchasing from Wrench Witch, on a firm fixed-price contract, a repair kit which contains replacement parts, instructions on how to make the repair, and the necessary tools to perform the repair. One of the tools is a device that applies and removes torque (aka wrench). The device is listed at a price of \$705.95. The Government technical reviewer has recommended acceptance of the wrench as proposed. However, the drawing of the tool looks like something you bought last week at the hardware store for \$27.95.

#### 1. As the contracting officer, what should you do?

- a. Since the wrench is only an item on the parts list and it is considered acceptable by the technical reviewer, ignore the apparent discrepancy and determine the overall price of the kit to be reasonable.
- b. Cancel the contract and ask for a new proposal.
- c. With the technical staff, perform a value analysis to determine if there are features that justify the price.
- d. Purchase the kit minus the suspect part and buy the wrench under small purchase procedures from your hardware store.

#### 2. What additional information would you want?

## WOODSON WORKS

In preparing the prenegotiation memorandum, the contracting officer noted that the auditors found 10,000 hours of Woodson Works' proposed design engineering effort to be unsupported because the estimate is based on "engineering judgement". However, the Government technical report, which was not available at the time of the audit report, recommended 8,500 hours based on a similar design effort.

**3. The contracting officer is documenting which major component of the prenegotiation memorandum?**

- a. Document the procurement situation
- b. Document contractor estimating rationale
- c. Document analysis and differences with contractor rationale
- d. Document consideration of risk in developing the negotiation position

**4. How should the differences in the reports be resolved?**

## Chapter 13 Vignette

### Text/Reference Pages 13-28 through 13-32

*Help Andrew bring it all together! This should be easy since you have summarized much of the needed information in earlier chapters.*

*Complete the following selected items from the major sections of the Price Prenegotiation Memorandum:*

#### ***Introductory Summary***

*Profit Rate:*    *Proposed* \_\_\_\_\_    *Objective* \_\_\_\_\_

*Remarks:*

*Contract Type:*

#### ***Particulars***

*Quantity being negotiated:*

*Unit Price:*    *Proposed* \_\_\_\_\_    *Objective* \_\_\_\_\_

## Chapter 13 Vignette

Text/Reference Pages 13-28 through 13-32

### *Procurement Situation*

*Describe contract items to be procured:*

*Place of performance:*

*Delivery schedule/period of performance:*

*History of previous buys:*

*Unique features of the procurement:*

*Outside influences:*

## Chapter 13 Vignette

### Text/Reference Pages 13-28 through 13-32

#### *Prenegotiation Summary*

COST ELEMENT	PROPOSED	OBJECTIVE	DIFFERENCE
Manufacturing	\$500,000		
Manufacturing Overhead	1,000,000		
Engineering	113,620		
Engineering Overhead	95,441		
Purchase Parts	1,133,000		
Commercial Items	849,750		
Material Overhead	41,638		
Other Direct Cost	13,400		
Subtotal	\$3,746,849		
G&A Expense	191,089		
Total Contractor Effort	3,937,938		
CAS 414 Cost of Money	160,441		
Total Cost	4,098,379		
Profit	636,964		
Total Price	4,735,343		

## **Chapter 13 Vignette**

### **Text/Reference Pages 13-28 through 13-32**

*Write an explanation of the difference and how you developed your objective. Be sure and include references to the contractor data and Government reports that were used in developing your objective.*

*Manufacturing*

*Manufacturing Overhead*

*Engineering*

*Engineering Overhead*

*Purchased Parts*

*Commercial Items*

*Material Overhead*

*Other Direct Cost*

*G&A Expenses*

*Total Contractor Effort*

*CAS 414 Cost of Money*

*Profit*

## ENVIRONMENTAL WONDER

A proposal for operational support of Government environmental clean up equipment contained a number of workers needed to perform the work. The audit and technical reports provided the following information: the proposed wage rates are in line with area wage rates for similar work; the proposed labor classifications are appropriate for the work to be performed; the number of workers proposed is less than half the number of workers currently performing the work and significantly less than any other offeror's proposal.

**1. In which of the cost realism elements does the above information suggest a problem:**

- a. Assessment of Technical Understanding
- b. Cost and Technical Inconsistencies
- c. Contract Completion Risk
- d. a & c

**2. Given the reports described above, what should the contracting officer do?**

Government technical and audit reports on the proposal of an offeror pointed out that while the offeror was proposing senior engineering personnel to perform the study, the proposed labor costs were based on salary rates for junior engineers.

**3. In which of the cost realism elements does the above information suggest a problem:**

- a. Assessment of Technical Understanding
- b. Cost and Technical Inconsistencies
- c. Contract Completion Risk
- d. b & c

**4. Given the reports described above, what should the contracting officer do?**

## PALE MAIL

Pale Laboratories issued a Request for Proposals (RFP) for “furnishing the necessary management, personnel, facilities, and equipment to provide mail distribution and support services” for the laboratory complex. The RFP solicited offers on a cost-plus-incentive-fee contract and offerors were informed that technical competence and cost realism would be the primary factors in selecting the contractor.

Three proposals were received and found to be within the competitive range. Oral discussions were held with all offerors during which pertinent technical and cost questions were reviewed. Offerors were requested to furnish written responses to the questions discussed. The total best and final offer costs for the basic and option contract years are shown below:

<b>Offeror</b>	<b>Proposed Costs</b>
United Mail	\$865,000
Northern, Inc.	\$841,000
Moka Services	\$891,000

The proposed costs do NOT appear to be realistic in all cases.

The Moka Services proposal contains \$1,000 in contingencies for material that the RFP clearly indicates will be furnished by the Government.

The Northern, Inc. proposal appears underestimated by a total of \$37,500.

Most wage classes required in the contract are covered by Service Contract Act wage determinations. In four classes that are NOT covered (10 of 37 employees on the contract), Northern proposed wages lower than those proposed or being paid by the incumbent, United Mail. It seems unreasonable to expect employees to continue to work on the same job for lower wages. Northern's technical proposal stated that 80 percent of United's employees would continue to work on the contract. Wages appear to be underestimated by \$6,300.

Northern's proposal included NO premium for shift work because they contended none is required under the contract. Government mail specialists, based on years of experience, feel that shift work will be required. The necessary shift premium is estimated at \$1,000.

*(continued on next page)*

No overtime was proposed for the senior clerk, as required by the RFP. Required overtime premium is estimated at \$500.

Northern proposed the same wage rates for the option year as for the basic contract year. The difference is \$29,700.

**5 . What adjustments should be made to the proposals to reflect realistic costs.**

**6 . Assuming that all offerors are equally qualified, which firm will receive the contract award?**

## Chapter 14 Vignette

### Text/Reference Page 14-19

*Get through this one and you don't have to help Andrew any more (at least not on this case). Give him some good answers that really show an in-depth knowledge of cost realism.*

- 1. Based on the available data, does WEC have an accurate understanding of the requirements?*
- 2. Are the cost estimates realistic given the technical requirements?*
- 3. Is the price of the procurement reasonable?*

CLASSROOM EXERCISE

# MACRO EXERCISE



WESLEY ELECTRONICS  
333 Broad Street  
Alpha, Mississippi 39999

RT/ARC 2000 Program Contracting Office  
Nighton, Ohio 45999

We are pleased to submit herewith our \$4,735,343 firm fixed-price proposal for the sixth production lot of the RT/ARC 2000 Radio Transceiver. This proposal is valid through August 31, 19X8. Any delay beyond that date will require reproposal and an extension of the delivery schedule.

We are proud of our strong relationship with your program office and our outstanding record on this program, described in Enclosure 1. Production of this small, very reliable, lightweight 85dbm radio transceiver is a model of successful acquisition partnership. We expect to continue that record of success.

A detailed review of your Technical Specifications dated 14 Mar 19X8 confirms that they are acceptable as written. The terms and conditions set forth in your solicitation are also acceptable. Required certifications are included in Volume I - Certifications and Representations.

Any questions concerning this proposal should reference our Proposal Number X-101 and should be directed to the undersigned or Ms. I. C. DeFuture, Chief of Estimating.

Sincerely,



I. M. Deboss

Encl:     1. Program History  
          2. Volume I - Certifications and Representations  
          3. Volume II - Cost Proposal

## PROGRAM HISTORY

In July 19X5, the Government established a requirement for a very small, lightweight, radio transceiver for use in both ground and air operations. Wesley Electronics was selected as the sole source capable of producing a quality transceiver on schedule and at a reasonable price.

The RT/ARC 2000 has been produced five times to meet the needs of the Government. The unit has proven to be extremely effective and reliable. Through four incentive contracts, we have never exceeded target cost by more than 3.4 percent. Even that overrun is considered positive in light of the tight delivery schedule and production problems of Lot 1. This record is made even more impressive by our record of on-time deliveries. Through four lots, we have never failed to deliver on schedule, even under the extremely tight Lot 1 schedule. For the last year, we have been delivering seven units each month.

### Pricing History

	<u>Lot</u>	<u>Contract Type</u>	<u>Target Price</u>	<u>Actual Price</u>
	1	CPIF	\$1,450,000	\$1,500,000
	2	CPIF	\$3,000,000	\$2,660,000
	3	FPIF	\$3,250,000	\$3,270,000
	4	FPIF	\$4,700,000	\$4,720,000
	5	FPIF	\$3,900,000	Unknown
(Proposed)	6	FFP	—	—

**Delivery History**

Year	Month	Lot					
		1	2	3	4	5	6
19X7	JAN	–					
	FEB	2					
	MAR	2					
	APR	1	3				
	MAY		6				
	JUN		6				
	JUL		5	2			
	AUG			7			
	SEP			7			
	OCT			7			
	NOV			7			
	DEC				7		
19X8	JAN				7		
	FEB				7		
	MAR				7		
	APR				7		
	MAY				7		
	JUN				4	3	
	JUL					7*	
	AUG					7*	
	SEP					7*	
	OCT					7*	
	NOV					7*	
	DEC					1*	6*
19X9	JAN						7*
	FEB						7*
	MAR						7*
	APR						7*
	MAY						7*
	JUN						7*
	JUL						2*
	AUG						–
	SEP						–
	OCT						–
	NOV						–
	DEC						–
Totals by Lot		5	20	30	46	39	50

\* Indicates projected future delivery

WESLEY

ELECTRONICS

333 Broad Street  
Alpha, Mississippi 39999

PROPOSAL X-101

LOT 6

RT/ARC 2000 RADIO TRANSCEIVER PRODUCTION


IN RESPONSE TO

REQUEST FOR PROPOSAL

NAS 1234

VOLUME II. COST

JULY 1, 19X8

<b>CONTRACT PRICING PROPOSAL COVER SHEET</b>		1. SOLICITATION/CONTRACT/ MODIFICATION NO. NAS1234		FORM APPROVED OMB NO. <b>9000-0013</b>
NOTE: This form is used in contract actions if submission of cost or pricing data is required. (See FAR 15.804-6(b))				
2. NAME AND ADDRESS OF OFFEROR (Include ZIP Code)  Wesley Electronics 333 Broad Street Alpha, Mississippi 39999		3A. NAME AND TITLE OF OFFEROR'S POINT OF CONTACT		3B. TELEPHONE NO.
		4. TYPE OF CONTRACT ACTION (Check)		
		<input checked="" type="checkbox"/> A. NEW CONTRACT	<input type="checkbox"/> D. LETTER CONTR.	
		<input type="checkbox"/> B. CHANGE ORDER	<input type="checkbox"/> E. UNPRICED ORDER	
5. TYPE OF CONTRACT (Check) <input checked="" type="checkbox"/> FFP <input type="checkbox"/> CPFF <input type="checkbox"/> CPIF <input type="checkbox"/> CPAF <input type="checkbox"/> FPI <input type="checkbox"/> OTHER (SPECIFY)		6. PROPOSED COST (A+B=C)		
		A. COST \$4,098,379	B. PROFIT/FEE \$636,964	C. TOTAL \$4,735,343
7. PLACE(S) AND PERIOD(S) OF PERFORMANCE Alph, Mississippi 39999, Aug X8 - X9				
8. List and reference the identification, quantity and total price proposed for each contract line item. A line item cost breakdown supporting this recap is required unless otherwise specified by the Contracting Officer (Continue on reverse, and then on plain paper, if necessary. Use same headings.)				
A. LINE ITEM #	B. IDENTIFICATION	C. QUANTITY	D. TOTAL \$	E. REF
1.	RT/ARC 1984 Transceiver	50	\$4,735,343	Prop- osal  Sum- mary
9. PROVIDE NAME, ADDRESS, AND TELEPHONE NUMBER FOR THE FOLLOWING (If available)				
A. CONTRACT ADMINISTRATION OFFICE Defense Logistics Agency (DLA) Alph, Mississippi 39999		B. AUDIT OFFICE DCAA Bayou Region Bayou, Louisiana 59999		
10. WILL YOU REQUIRE THE USE OF ANY GOVERNMENT PROPERTY IN THE PERFORMANCE OF THIS WORK? (If "Yes", identify)  <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		11A. DO YOU REQUIRE GOVERNMENT CONTRACT FINANCING TO PERFORM THIS PROPOSED CONTRACT? (If "Yes," complete 11B)  <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	11B. TYPE OF FINANCING (✓ 1)  <input type="checkbox"/> ADVANCED <input checked="" type="checkbox"/> PROGRESS PAYMENTS    PAYMENTS <input type="checkbox"/> GUARANTEED LOANS	
12. HAVE YOU BEEN AWARDED ANY CONTRACTS OR SUBCONTRACTS FOR THE SAME OR SIMILAR ITEMS WITHIN THE PAST 3 YEARS? (If "Yes", identify item(s), customer(s) and contract number(s))  <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		13. IS THIS PROPOSAL CONSISTENT WITH YOUR ESTABLISHED ESTIMATING PRACTICES AND PROCEDURES AND FAR PART 31 COST PRINCIPLES? (If "No", explain)  <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
14. COST ACCOUNTING STANDARDS BOARD (CASB) DATA (Public Law 91-379 as amended and FAR PART 30)				
A. WILL THIS CONTRACT ACTION BE SUBJECT TO CASB REGULATIONS? (If "No," explain in proposal)  <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		B. HAVE YOU SUBMITTED A CASB DISCLOSURE STATEMENT (CASB DS-1 OR 2)? (If "Yes," specify in proposal the office to which submitted and if determine to be adequate)  <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO    DCMAO Bayou		
C. HAVE YOU BEEN NOTIFIED THAT YOU ARE OR MAY BE IN NON COMPLIANCE WITH YOUR DISCLOSURE STATEMENT OR COST ACCOUNTING STANDARDS? (If "Yes," explain in proposal)  <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		D. IS ANY ASPECT OF THIS PROPOSAL INCONSISTENT WITH YOUR DISCLOSED PRACTICES OR APPLICABLE COST ACCOUNTING STANDARDS? (If "Yes," explain in proposal)  <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
This proposal is submitted in response to the RFP, contract, modification, etc. in Item 1 and reflects our best estimates and/or actual costs as of this date and conforms with the instructions in FAR 15.804-6(b)(2), Table 15-2. By submitting this proposal, the offeror, if selected for negotiation, grants the contracting officer or an authorized representative the right to examine, at any time before award, those books, records, documents and other types of factual information, regardless of form or whether such supporting documentation is specifically referenced or included in the proposal as the basis for pricing, that will permit an adequate evaluation of the proposed price.				
15. NAME AND TITLE (Type) I M. DeBoss President		16. NAME OF FIRM Wesley Electronics		
17. SIGNATURE 			DATE OF SUBMISSION 1 Jul 19X8	

## COST PROPOSAL

Cost Element	Rate	Dollars	Reference
Manufacturing Labor HRS	50,000		
Manufacturing Labor \$	\$10.00	500,000.00	A
Manufacturing Overhead	200.00%	1,000,000.00	E
Engineering Labor HRS	5,750		
Engineering Labor \$	\$19.76	113,620.00	B
Engineering Overhead	84.00%	95,440.80	E
Purchased Parts		1,133,000.00	C
Commercial Items		849,750.00	C
Material Overhead	2.10%	41,637.75	E
Other Direct Costs		13,400.00	D
Subtotal		3,746,848.55	
G&A Expense	5.10%	191,089.28	E
Total Cost		3,937,937.83	
Profit	17.00%	636,964.25	F
Cost of Money			E
Manufacturing	0.21000	105,000.00	
Engineering	0.04000	4,544.80	
Material	0.02000	39,655.00	
G&A	0.00300	11,240.55	
Total Price		4,735,342.43	

**A. Direct Manufacturing Labor**

This proposal calls for the manufacturing, assembling, and inspection of complex, high quality radio transceivers. A minimum of 50,000 labor-hours are required to produce these systems based on past experience:

Proposed Hours	50,000
Proposed Labor Rate	\$10.00 per hour
Proposed Manufacturing Labor Cost	\$500,000

These estimates were arrived at through use of production labor hour history and labor rate projections.

LOT	NUMBER OF UNITS	TOTAL MFG HOURS
1	5	13,800
2	20	32,900
3	30	40,950
4	46	55,784
5	39	NOT AVAILABLE

Proposed Labor-Hour Loading Schedule:

MONTH	HOURS	MONTH	HOURS
SEP X8	4,500	FEB X9	6,000
OCT X8	6,000	MAR X9	4,500
NOV X8	7,000	APR X9	4,500
DEC X8	7,000	MAY X9	2,000
JAN X9	7,000	JUN X9	1,000
		JUL X9	500

Manufacturing labor rate is based on historical projections. It is assumed that approximately 40% of the work will be performed in 19X8 and 60% in 19X9:

YEAR	RATE	YEAR	RATE
19X6	8.20	19X8	9.80 <sup>a</sup>
19X7	9.00	19X9	10.20 <sup>a</sup>
(\$9.80 * 49%) + (\$10.20 * 51%) = \$10.00			

<sup>a</sup> indicates that the rate is a projected rate

**B. Engineering Labor**

This proposal calls for engineering of a recurring nature only for this follow-on production run. We have estimated the total engineering effort required to encompass 5,750 hours. Direct Engineering Labor is proposed as a factor applied to Direct Manufacturing Labor hours:

Proposed Hours (50,000 Mfg Hrs times 11.5%)	5,750
Proposed Labor Rate	\$19.76 per hr.
Proposed Total Dollars	\$113,620

Shop Liaison Labor-Hour Loading Schedule:

MONTH	HOURS	MONTH	HOURS
SEP X8	517.5	MAR X9	517.5
OCT X8	690.0	APR X9	517.5
NOV X8	805.0	MAY X9	230.0
DEC X8	805.0	JUN X9	115.0
JAN X9	805.0	JUL X9	57.5
FEB X9	690.0		

Engineering labor rate is based on historical projections. It is assumed that approximately 49% of the work will be performed in 19X8 and 51% in 19X9:

YEAR	RATE	YEAR	RATE
19X6	16.70	19X8	18.68 <sup>a</sup>
19X7	17.60	19X9	20.80 <sup>a</sup>
(\$18.68 * 49%) + (\$20.80 * 51%) = \$19.76			

<sup>a</sup> indicates that the rate is a projected rate

**C. Material Costs**

1. Purchased Parts \$1,100,000

Purchased parts includes 987 individual line items in support of this procurement, with quantities of some line items as high as 500 units. Because of the great volume of items and sources (15) involved, we have prepared a computerized bill of materials listing and cross referenced items to units and quoted prices. Due to the bulk of this list and supporting data, we have not furnished a

copy with this proposal. However, these documents are on file and will be made available to reviewing agencies upon request.

2. Commercial Items \$825,000

The antenna used in the RT/ARC 2000 is a standard commercial antenna produced by Sooper Antenna. Currently, Sooper is the only firm producing an antenna meeting our specifications and delivery requirements. Their proposed unit price of \$16,500 is the same as their commercial catalog price as indicated on the following SF 1412 dated May 15, 19X8.

3. Scrap & Usage Factor

A scrap and Usage factor is applied at 3% of total material costs. The factor is based on history scrap and losses in our production processes.

Total proposed material costs are as follows:

MATERIAL CATEGORY	PROPOSED BASE MATERIAL COST	SCRAP & USAGE FACTOR	PROPOSED CATEGORY TOTAL COSTS
Purchased Parts	\$1,100,000	\$33,000	\$1,133,000
Commercial Items	\$825,000	\$24,750	\$849,750
Total Proposed Material Costs			\$1,982,750

**D. Other Direct Costs**

In accordance with the Request For Proposal, we will be performing field quality inspections on major critical vendors. To meet this specific requirement, we propose to contract for quality assurance representatives on a contract labor basis. The following is a summary of the contract labor costs.

COST ITEM	DOLLARS
Labor Days: 30 days @ \$200 per day	6,000
Per Diem: 30 days @ \$130 per day	3,900
Estimated Air Fares	3,500
Total ODC Costs	13,400

<b>CLAIM FOR EXEMPTION FROM SUBMISSION OF CERTIFIED COST OR PRICING DATA</b>		FORM APPROVED OMB NO. 3090-0116
1. OFFEROR (Name, address, ZIP Code)  Sooper Antenna 100 Main St. Biloxi, Mississippi 49878		3. SOLICITATION NO. F33657-x8-9999  4. ITEM OF SUPPLIES AND/OR SERVICES TO BE FURNISHED  Antenna and Coupler
2. DIVISION(S) AND LOCATION(S) WHERE WORK IS TO BE PERFORMED Biloxi, Mississippi	5. QUANTITY 50	4. TOTAL AMOUNT PROPOSED FOR ITEM \$825,000
By submission of this form the offeror claims exemption from requirements for submitting certified cost or pricing data on the basis that the price offered is based on an established catalog or market price of a commercial item sold in substantial quantities to the general public or is a price set by law or regulation (see FAR 15.804-3). Complete Section I, II, III below as applicable.		
SECTION I - CATALOG PRICE (See Instructions for items 7 thru 11 on reverse.)		
7. CATALOG IDENTIFICATION AND DATE Sooper Catalog, page 85, Item 81-J, 1 Jan X8		8. SALES PERIOD COVERED 1 Jan X8                      31 Mar X8 FROM                              TO
9. CATEGORIES OF SALES a. U.S. Government sales b. Sales at catalog price to general public c. Other sales to general public	TOTAL UNITS SOLD* 49 29 13	10. REMARKS  Sale 11a was discounted 10% because of total sales over \$5,000,000
*If your accounting system does not provide precise information, insert your best estimate and explain the basis for it in Item 10, REMARKS. Continue on a separate sheet, if necessary.		
11. LIST THREE SALES OF THE ITEM OFFERED		
SALES CATEGORY	DATE	NO. OF UNITS SOLD                      PRICE/UNIT
a. <input type="checkbox"/> B. <input checked="" type="checkbox"/> C.	21 Apr 19X8	13                      \$14,850
b. <input checked="" type="checkbox"/> B. <input type="checkbox"/> C.	15 Feb 19X8	9                      \$16,500
c. <input checked="" type="checkbox"/> B. <input type="checkbox"/> C.	18 Mar 19X8	7                      \$16,500
SECTION II - MARKET PRICE (See Instructions for item 12 on reverse.)		
12. SET FORTH THE SOURCE AND DATE OR PERIOD OF THE MARKET QUOTATION OR OTHER BASE FOR MARKET PRICE, THE BASE AMOUNT, AND APPLICABLE DISCOUNTS.		
SECTION III - LAW OR REGULATION (See Instructions for item 13 on reverse.)		
13. IDENTIFY THE LAW OR REGULATION ESTABLISHING THE PRICE OFFERED		
REPRESENTATION (See Instructions for item 14 on reverse.)		
The offeror represents that all statements made above and on attachments submitted are accurate and are submitted for the purpose of claiming exemption from requirements for submitting certified cost or pricing data. The offeror also represents that, except as stated in an attachment, a like claim for exemption involving the same or a substantially similar item has not been denied by a Government Contracting Officer within the last 2 years. Pending consideration of the proposal supported by this submission and, if this proposal or a modification of it is accepted by the Government, until the expiration of 3 years from the date of final payment under a contract resulting from this proposal, the Contracting Officer or any other authorized employee of the United States Government is granted access to books, records, documents, and other supporting data that will permit verification of the claim.		
14. TYPED NAME, TITLE AND FIRM  U. R. Sooper President Sooper Antenna	15. SIGNATURE  	16. DATE OF SUBMISSION  15 Jun X8
NSN 7540-01-142-9846 1412-101		STANDARD FORM 1412 (10-83) Prescribed by GSA FAR (48 CFR) 53.215-2(b)

## E. Rates & Factors

The 19X8 and forward proposed rate is based on a linear trend analysis of overhead rates proposed over the past three years. We consider this method of overhead estimation to be extremely accurate. Between 19X5 and 19X7, the average absolute difference between proposed and actual overhead rates has been just over 2%, which is insignificant.

### 1. Overhead Rate and Factors

#### History of Proposed Overhead and Projections (calendar year)

	19X5	19X6	19X7	19X8 & Forward
Material	2.1%	2.1%	2.1%	2.1%
Engineering	75.0%	78.0%	81.0%	84.0%
Manufacturing	144.0%	163.0%	179.0%	200.0%
G&A	5.2%	5.1%	5.1%	5.1%

#### Actual Overhead Rates Experienced

	19X4	19X5	19X6	19X7
Material	1.9%	1.9%	2.0%	2.4%
Engineering	66.7%	70.3%	73.3%	75.4%
Manufacturing	155.0%	150.0%	159.1%	178.6%
G&A	5.7%	5.0%	5.2%	5.6%

#### Projected Overhead Bases for 19X8 and Beyond

Estimates of overhead bases for 19X8 and 19X9 are based on firm estimates of commercial and Government sales volume. This includes \$5.4 million production of RT/ARC 1999, research and production of the U.S. Navy Flying Dutchman system, and commercial production for Radio World stores. If we are successful in our current proposal for production of a line of commercial ratios for Static Stores, these bases may be expected to increase by ten percent. However, we estimate only a twenty-five percent probability of obtaining this new business. Current overhead base projections are:

Material Overhead.....	\$7,000,000	Manufacturing Overhead.....	\$9,000,000
Engineering Overhead ...	\$5,600,000	G&A Expense.....	\$47,000,000

## Overhead Account Actuals (in thousands of dollars)

	19X4		19X5		19X6		19X7	
	pool	base	pool	base	pool	base	pool	base
Material	\$157	\$7,500	\$160	\$8,000	\$150	\$7,000	\$145	\$6,000
Engineering	\$4,400	\$6,600	\$5,200	\$7,400	\$4,400	\$6,000	\$4,000	\$5,300
Manufacturing	\$15,500	\$10,000	\$18,000	\$12,000	\$17,500	\$11,000	\$15,000	\$8,400
G&A Expense	\$2,600	\$46,000	\$2,700	\$54,000	\$2,600	\$50,000	\$2,300	\$41,000

## Overhead Account Bases

Material Overhead - Direct Material Dollars

Engineering Overhead - Direct Engineering Labor Dollars

Manufacturing Overhead - Direct Manufacturing Labor Dollars

G&A - Total Manufacturing Costs including: manufacturing labor, manufacturing overhead, engineering labor, engineering overhead, direct material costs, material overhead, other direct costs, and other costs excluding CAS 414 cost of money.

## 2. Direct Labor Rates

Labor rate projections are based on historical trends adjusted for future economic and market factors. The following is a summary of our historical and projected rates:

	19X6	19X7	19X8*	19X9*
Engineering	\$16.70	\$17.60	\$18.68	\$20.80
Manufacturing	\$8.20	\$9.00	\$9.80	\$10.20

\*Proposed

The major factors influencing labor rates are: strong competition for engineering resources, a general wage increase per our labor agreements, and cost of living allowances.

### 3. Facilities Capital Cost of Money

A CASB-CMF Form was used to develop the Facilities Capital Cost of Money factors.

POOL	ALLOCATION BASE	COST OF MONEY FACTOR	COST OF MONEY DOLLARS
Material	\$ 1,325,000	.02000	\$ 26,500
Engineering	\$ 150,000	.04000	\$ 6,000
Manufacturing	\$ 500,000	.21000	\$ 105,000
G&A	\$ 3,128,825	.00300	\$ 9,386
Total Cost of Money			\$ 146,886

### F. Profit Rate

The profit rate of 17% is fair and reasonable given our outstanding performance and high expertise in producing high quality, complex radio systems for the Government.

10 September 19X8

To: Anthony Uca, Buyer  
From: P. Changeorder, ACO  
Subject: Request for Proposal Analysis on Wesley Electronics

1. In compliance with your request, reviews of the WEC proposal have been conducted. The review is summarized below with recommendations based on our analysis, technical evaluation, audit evaluation, and a field pricing report on the TTI SF 1411.
2. It is notable that subsequent to preparation of the audit report, a Forward Pricing Rate Agreement (FPRA) was negotiated between this office and WEC. The FPRA covers labor, overhead, and cost of money rates, and should be used by Government offices in pricing and negotiating with WEC. A table of FPRA rates is attached to this report. Also, please review the table on calculation of cost of money factors.
3. The summary on the following page incorporates the results of the above mentioned reviews.

# PROPOSAL ANALYSIS

Cost Element	Proposed		Recommended X8		Recommended X9		Total Recommended	Difference	Notes
	Rate	Dollars	Rate	Dollars	Rate	Dollars			
Manufacturing:									
Labor HRS	50,000		23,030		23,970				
Labor \$	\$10.00	\$500,000	\$9.40	\$216,482	\$10.11	\$242,337	\$458,819	\$41,181	1
Over head	200.00%	\$1,000,000	169.80%	\$367,586	166.40%	\$403,248	\$770,834	\$229,166	2
Engineering:									
Labor HRS	5750		0		3,290				
Labor \$	\$19.76	\$113,620	\$18.65	\$0	\$20.10	\$66,129	\$66,129	\$47,491	3
Overhead	84.00%	\$95,441	74.20	\$0	72.50%	\$47,944	\$47,944	\$47,497	2
Material:									
Purchased Parts		\$1,133,000		\$453,200		\$679,800	\$1,133,000	\$0	4
Commercial Items		\$849,750		\$307,970		\$461,955	\$769,925	\$79,825	5
Material Overhead	2.10%	\$41,638	2.10%	\$15,985	2.10%	\$23,977	\$39,962	\$1,676	2
ODCs		\$13,400		\$0		\$0	\$0	\$13,400	6
Subtotal		\$3,746,849		\$1,361,223		\$1,925,391	\$3,286,614	\$460,235	
G&A Expense	5.10%	\$191,089	5.60%	\$76,229	5.40%	\$103,971	\$180,199	\$10,890	2
Total Cost Less COM		\$3,937,938		\$1,437,451		\$2,029,362	\$3,466,813	\$471,125	
Cost of Money:									
Manufacturing	0.21000	\$105,000	0.19600	\$42,430	0.18756	\$45,453	\$87,883	\$17,117	7
Engineering	0.04000	\$4,545	0.03786	\$0	0.03446	\$2,279	\$2,279	\$2,266	7
Material	0.02000	\$39,655	0.01667	\$12,689	0.01558	\$17,789	\$30,478	\$9,177	7
G&A	0.00300	\$11,241	0.00277	\$3,771	0.00259	\$4,987	\$8,758	\$2,483	7
Total Cost		\$4,098,378		\$1,496,341		\$2,099,870	\$3,596,211	\$502,167	
Profit	17.00%	\$636,964							
Total Price		\$4,735,343							

MACRO EXERCISE

- Note 1: See technical evaluation paragraph 6 for hours. The rates are from the FPRA summary.
- Note 2: Indirect costs are calculated on the recommended base dollars using rates from the FPRA summary.
- Note 3: See technical evaluation paragraph 5 for hours. The rates are from the FPRA summary.
- Note 4: The audit report found one \$1,000 verbal quote to be unsupported. Subsequent to the audit, the contractor placed a purchase order at the quoted amount. The purchase order appears reasonable; therefore, the \$1,000 and related factored costs are restored.
- Note 5: The recommended amount is based on the technical evaluation of price reasonableness (see technical report paragraph 4).
- Note 6: WEC agreed-to reduction.
- Note 7: Cost of Money Factors are listed in the FPRA summary. The change in the factors from the audit recommended factors is due to the impact of labor rates on the allocation bases.

Patricia Changeorder  
Administrative Contracting Officer

Attachments:

1. Tech Report
2. Audit Report
3. FPRA Summary

# TECHNICAL REPORT

FROM: I. M. Wright  
TO: P. Changeorder  
SUBJECT: TACP Proposal NAS12345

16 August 19X8

1. In compliance with your request of 25 July 19X8, we have conducted a complete technical review of the subject proposal. The findings of this review are discussed in the following paragraphs.

2. General The RT/ARC 2000 units being produced on the contract are identical to those currently being produced under contract NAS12344. Therefore, that contract and previous production runs for this item were used as a baseline for this review. While the contractor failed to breakout material acquisition between the years 19X8 and 19X9, we believe a 60/40 split is reasonable. The contractor has made significant progress toward a just-in-time inventory method. As a result, a greater portion of materials are projected to be acquired during production rather than acquiring materials well in advance of production needs. The 60/40 split for 19X8/19X9 reflects documented progress and internal company management goals.

3. Purchased Parts Review of the proposed material revealed no areas of significant exception. The scrap & usage rate of 3% is consistent with a gradually improving trend on this product line.

4. Commercial Items During the past six months, the Government has purchased several similarly modified antennae directly from Sooper Antenna for delivery during October-December 19X8. These units are very similar in design and construction to the units being purchased for the RT/ARC 2000. While none of these are exactly the same as the 85 dbm unit to be used in this contract and the use of Government Furnished Property (GFP) is not approved for this contract, the price history may be used as a comparison base.

dbm*	Lots of 50 Cost per Unit
130	\$13,000
100	\$14,800
90	\$15,400
70	\$16,600

\* dbm (thousands of decibels) is a measure of antenna sensitivity, with the lowest dbm being the most sensitive.

The average of these prices is \$14,950 (\$59,800/4). Using this figure, our recommended cost is \$747,500 (\$14,950 \* 50).

5. Engineering Hours In spite of the contractor's insistence on proposing manufacturing liaison as a factor of manufacturing labor, the contract has historically maintained a dedicated staff to support RT/ARC 2000 production. During production of lots 1 and 2, four people were dedicated to the program. During lots 3, 4, and 5, the contractor maintained 3 dedicated people. While it is our opinion that there is insufficient work to keep three people busy all the time, we accept a staffing level of 3 due to the potential extra effort required by recommended changes in the fabrication process (see paragraph 6).

a. The following recommended work-hours are based on 1,880 work-hours per year per employee.

$$3 \text{ people} * 1,880 \text{ hrs} = 5,640 \text{ hrs per year}$$

$$\frac{5640}{12 \text{ months}} = 470 \text{ hrs per month}$$

$$7 \text{ months} * 470 \text{ hrs} = 3,290 \text{ hrs for 19X9}$$

$$+ 1 \text{ month} * 0 \text{ hrs} = 0 \text{ hrs for 19X8}$$

$$\text{Total Recommended hrs} = 3,290 \text{ hrs}$$

This contract should not pay for engineering in 19X8. During our review, we examined the lot 5 history and found that the contractor proposed a staffing level of 3, and the Government, based on the Price Negotiation Memorandum, recognized the cost in the lot 5 price. Since the 19X8 effort for lot 6 overlaps the end of lot 5, no additional charges to the Government should be recognized.

6. Manufacturing Hours. In reviewing the proposed manufacturing hours, the entire history of the RT/ARC 2000 production was used. We attempted to establish an improvement curve for the project and found lot 1 to be totally out of line with the balance of the data. In an attempt to further define the cost history, we used the contractor's cost accounting data to split the manufacturing history into fabrication hours and assembly hours used the contractor's cost accounting data. By splitting the hours, we found that the extraordinarily high hours for lot 1 were associated with fabrication.

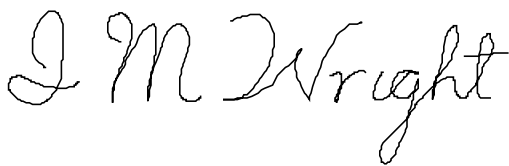
a. Fabrication: At the beginning of the project, the contractor attempted to implement a highly automated new technology for fabricating several of the radio's major components. The technology, at that time, was new and unproven. The contractor was unable to perfect the process and reverted to manual methods. Since 19X4, significant improvements in the automated process have been made. In discussions with the contractor, it was conceded that the automated process is feasible and could be put in place in time for use on lot 6. Therefore, we recommend a should-cost value of 500 hrs per unit. Please note that due to the highly automated nature of the recommended process, future reductions through the use of improvement curves are unlikely.

b. Assembly: After removing the fabrication history, the assembly history clearly shows an improvement curve of approximately 92%. The proposed hours associated with assembly are in line with the improvement curve and are acceptable.

	FABRICATION	ASSEMBLY	TOTAL MFG HRS
<b>LOT 1</b>	10,175	3,625	13,800
<b>LOT 2</b>	21,100	11,800	32,900
<b>LOT 3</b>	25,200	15,750	40,950
<b>LOT 4</b>	33,704	22,080	55,784

c. Summary of Manufacturing Recommended Hours:

MANUFACTURING CATEGORY	RECOMMENDED			
	HOURS PER UNIT	19X8 HOURS	19X9 HOURS	TOTAL HOURS
<b>Fabrication</b>	500	16,500	8,500	25,000
<b>Assembly</b>	440	6,530	15,470	22,000
<b>Total</b>	940	23,030	23,970	47,000



I. M. Wright  
Chief, Technical Division

# AUDIT REPORT

TO: P. Changeorder, ACO

15 August 19X8

FROM: I. M. Careful

SUBJECT: Advisory Audit Report on Evaluation of Firm Fixed-Price Proposal  
for RT/ARC 2000

1. Purpose and Scope of Audit. In response to your request of 25 July 19X8, we reviewed the subject proposal to determine the reasonableness of the proposed costs. The contractor proposes to furnish RT/ARC 2000 transceivers on a firm fixed-price basis for a total amount of \$4,735,343.

Our review was performed in accordance with generally accepted auditing standards and included such tests of the contractor's data and records and such other auditing procedures as were considered necessary under the circumstances. The cost principles contained in FAR Part 31 were used as criteria in the determination of acceptable costs.

This report may not be released to any Federal agency without prior approval of Headquarters, DCAA, except where an agency requests the report in connection with the negotiation or administration of a contract by that agency.

2. Special Circumstance Affecting the Examination. The results of our review are qualified as described below.

a. As stated in the request for audit, we will not be provided with the results of a technical evaluation. Although we reviewed the proposal to the extent possible under the circumstances, we were unable to reach a definitive conclusion on certain of the quantitative and qualitative aspects of the proposal by available audit means. The results of our review are, therefore, qualified accordingly.

b. At the time of this report, the contractor has recently submitted a forward pricing rate proposal. While our audit report has not been released, this audit includes labor and overhead rate recommendations based on our preliminary audit findings. It is suggested that you check with the cognizant contracting officer or this office prior to negotiation to determine any rate changes as a result of forward pricing rate agreement negotiations.

c. The proposed period of performance spans two accounting periods. Since the contractor did not breakout the effort by year, the audit summary does not breakout cost by year. The purpose of presenting our findings as a composite is to facilitate comparison of our results to the original proposed costs.

3. Conclusions. We consider the offeror's proposal to be acceptable as a basis for negotiation of a price. This statement should not be interpreted to mean that the data are necessarily accurate, complete and current in all respects in accordance with Public Law 87-653, since a postaward review may disclose evidence not now discernible; nor should this statement be interpreted to mean that the offeror is necessarily in compliance with Public Law 91-379, since a final recommendation cannot be made in a preaward evaluation. Instances of noncompliance with Public Law 91-379 may be reported during contract performance.

The results of our review are detailed in Exhibit A and Appendices of this report.

The results of our review were discussed with the contractor's designated representative, Mr. John E. Carson, President, to the extent necessary to determine the basis for the proposed costs and to establish the validity of our audit results.

Caution is urged in using the information contained in this report for any purpose other than that immediately intended without prior consultation with this office regarding its applicability.

Please furnish our office with a copy of the memorandum of negotiations in accordance with FAR 15.808(b).

Defense Contract Audit Agency

A handwritten signature in cursive script that reads "I M Careful". The signature is written in black ink and is positioned above the printed name of the signatory.

I. M. Careful, Branch Manager

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Statement of Contractor's Proposal and Audit Review	Exhibit A
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**EXHIBIT A**

<b>Element of Proposal</b>	<b>Contractor Proposed</b>	<b>Costs Questioned</b>	<b>Costs Unsupported</b>	<b>Notes*</b>
Mfg Labor	\$500,000			1
Mfg Overhead	\$1,000,000	\$161,916		2
Eng Labor	\$113,620	\$2,926		3
Eng Overhead	\$95,441	\$15,068		4
Purchased Parts	\$1,133,000		\$1,030	5
Commercial Items	\$849,750			6
Material Overhead	\$41,638	\$1,189	\$22	7
Other Direct Costs	\$13,400	\$13,400		8
Total Mfg Cost	\$3,746,849			
G&A Expenses	\$191,089			9
Total Contractor Effort	\$3,937,938			
CAS 414 Cost of Money	\$160,441	\$19,879	\$19	10
Total Cost	\$4,098,379	\$214,378	\$1,071	

\* See page Macro Exercise–24

## EXPLANATORY NOTES

1. In the absence of technical evaluation, manufacturing hours were not reviewed. No exception is taken to the 50,000 hours proposed, 24,500 hours in X8 and 25,500 hours in X9. Rather than using a single wage rate for the two contract years, projected rates were applied to the hours for each year.

Mfg Labor Cost	Proposed	Recommended X 8	Recommended X 9
Mfg Lab Hours	50,000	24,500	25,500
Mfg Labor Rate	\$10.00	\$9.80	\$10.20
Mfg Labor Dollars	\$500,000	\$240,100	\$259,900

Because of rounding differences, the audit method resulted in total manufacturing labor costs of \$500,200. The proposed costs were accepted and the \$200 difference subtracted from the Recommended X9 costs, reducing the X9 cost from \$260,100 to \$259,900.

2. Questioned costs result from reductions in the proposed overhead rate. For further information on overhead rate analysis, see Appendix 4.

Cost	Proposed	Recommended X 8	Recommended X 9	Questioned
Mfg Labor Cost Base	\$500,000	\$240,100	\$259,900	-0-
Mfg Overhead Rate	200.0%	169.8%	165.6%	As Shown
Mfg Overhead Dollars	\$1,000,000	\$407,690	\$430,394	\$161,916

3. In the absence of a technical evaluation, engineering hours were not reviewed. The questioned cost is the result of reductions in the proposed hourly wage rate. The proposed wage rate is higher than recent history would indicate is necessary to attract qualified workers. The contractor contends that the increase is necessitated by the growing national shortage of engineers and correspondingly higher wages. Our audits of other local contractors have not revealed the need for the level of increases proposed by the contractor. Accordingly, we have questioned the proposed wage rate as shown below.

<b>Eng Labor Cost</b>	<b>Proposed</b>	<b>Recommended X 8</b>	<b>Recommended X 9</b>	<b>Questioned</b>
Eng Labor Hours	5,750	2,818	2,932	-0-
Eng Labor Rate	\$19.76	\$18.68	\$19.80	As Shown
Eng Lab Dollars	\$113,620	\$52,640	\$58,054	\$2,926

4. Questioned costs are the result of recommended reductions in labor rates and recommended reductions in the engineering overhead rate.

<b>Eng Ovhd Cost</b>	<b>Proposed</b>	<b>Recommended X 8</b>	<b>Recommended X 9</b>	<b>Questioned</b>
Eng Labor Cost Base	\$113,620	\$52,640	\$58,054	\$2,926
Eng Ovhd Rate	84.0%	73.5%	71.8%	As Shown
Eng Ovhd Dollars	\$95,441	\$38,690	\$41,683	\$15,068

5. The purchased parts records referenced in the proposal were reviewed by this office. All quotes over \$50 were reviewed individually for accuracy and support. This constituted a review of 93 percent of all purchased parts dollars. Except for one verbal \$1,000 quote from Herty Gerty Industries for a variety of components all prices were supported by written quotations. Some 70 percent of the items were quoted by three or more suppliers. The scrap and usage factor, of 3 percent was reviewed, and found to be acceptable. No costs are questioned. Costs found unsupported are the \$1,000 in purchased parts and the related scrap and usage.

<b>Purchased Parts Cost</b>	<b>Proposed</b>	<b>Recommended X 8</b>	<b>Recommended X 9</b>	<b>Unsupported</b>
Purchased Parts	\$1,100,000	\$439,017	\$659,983	\$1,000
Scrap & Usage Rate at 3%	\$33,000	\$13,171	\$19,799	\$30
Total Purchased Parts Cost	\$1,133,000	\$452,188	\$679,782	\$1,030

6. No exception is taken to the proposed commercial item costs. While a formal report has not been received, a Government audit of the SF 1412 supporting data has been completed. The report validates the supporting sales data. Allowance of the proposed exemption is up to the discretion of the contracting officer.
7. Questioned costs are the result of recommended reductions in the material overhead rate for 19X9, from 2.1 percent to 2.0 percent. Unsupported costs result from applying the 19X8 overhead rate to the unsupported material costs.

<b>Material Ovhd Cost</b>	<b>Proposed</b>	<b>Recom-mended X8</b>	<b>Recom-mended X9</b>	<b>Questioned</b>	<b>Unsup-ported</b>
Material Cost Base	\$1,982,750	\$792,088	\$1,189,632	-0-	\$1,030
Material Ovhd Rate	2.1%	2.1%	2.0%	As Shown	
Mat Ovhd Dollars	\$41,638	\$16,634	\$23,793	\$1,189	\$22

8. The entire amount of Other Direct Cost for contracted quality assurance support is questioned. During our review, it was discovered that the contractor had discontinued plans for an aggressive field quality assurance inspection program. In the unlikely event that field quality assurance inspections are needed, they will be performed by in-house quality assurance personnel, charging to manufacturing overhead. The contractor contends that the inclusion of this proposed cost was an error on the part of the estimator who neglected to correct the proposal to reflect the management decision to not contract for services as originally intended.

9. During our review of this proposal, the contractor increased its proposed rates for G&A Expense. The recommended rates, 5.5 percent for X8 and 5.3 percent for X9, are based on our evaluation of the most recent data. While proposed costs burdened by G&A have been reduced, corrections to the proposed G&A rates actually result in \$288 more G&A Expense than currently proposed. Therefore, we are not questioning proposed G&A Expense dollars.

<b>G&amp;A Expense</b>	<b>Proposed</b>	<b>Recommended X 8</b>	<b>Recommended X 9</b>	<b>Questioned &amp; Unsupported</b>
Total Mfg Cost Base	\$3,746,849	\$1,547,842	\$2,003,456	\$195,551
G&A Rate	5.1%	5.5%	5.3%	As Shown
G&A Dollars	\$191,089	\$85,131	\$106,183	(\$225)

10. Wesley Electronics used a CASB/CMF Form to develop their cost of money factors. While the factors are currently undergoing update and review, we recommend use of recommended rates contained in Appendix 4, Attachment 6. The proposed net book values (NBVs) appear reasonable. The contractor's projected capital acquisitions and retirements along with current capital assets should result in no significant change in NBVs in 19X8 and 19X9. Differences in the factors are the result of changes in the allocation base values.

Costs questioned and unsupported are summarized in the table below. Cost questioned result from bases questioned and cost of money factors questioned. Costs unsupported are based on material dollars unsupported and the recommended cost of money factors.

## MACRO EXERCISE

Cost of Money	Proposed	Recom- mended X8	Recom- mended X9	Questioned	Unsupported
<b>Mfg COM</b>					
Labor Cost Base	\$500,000	\$240,100	\$259,900	See Note 1	
COM Rate	.21000	.19600	.18568	As Shown	
COM Dollars	\$105,000	\$47,060	\$48,258	\$9,682	-0-
<b>Eng COM</b>					
Labor Cost Base	\$113,620	\$52,640	\$58,054	See Note 3	
COM Rate	.04000	.03786	.03475	As Shown	
COM Dollars	\$4,545	\$1,993	\$2,017	\$535	-0-
<b>Mat COM</b>					
Material Cost Base	\$1,982,750	\$792,088	\$1,189,632	See Notes 5 & 6	See Notes 5 & 6
COM Rate	.02000	.01667	.01558	As Shown	As Shown
COM Dollars	\$39,655	\$13,204	\$18,534	\$7,900	\$17
<b>G&amp;A COM</b>					
Tot Cost Base	\$3,746,849	\$1,547,842	\$2,003,456	See Note 9	See Note 9
COM Rate	.00300	.00277	.00259	As Shown	As Shown
COM Dollars	\$11,241	\$4,288	\$5,189	\$1,762	\$2
<b>Total COM</b>	\$160,441	\$66,545	\$73,998	\$19,879	\$19

## APPENDIX 1

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### WESLEY ELECTRONICS

#### Contractor's Organization and Operation

Wesley Electronics is an independent corporation which has been operating since 24 July 1965.

Government contracts account for the major portion of Wesley's sales. Of the total sales in 19X7, cost type contracts represented about 40% and fixed-price and commercial work about 60%.

Wesley is engaged in engineering research, development and production of electronic systems and components. The firm has active programs in three major product areas - Electronic Warfare Systems, Communications Systems and Equipment, and Production Electronics.

Corporate facilities are above average for a business of this type. The corporate plant is seven years old, and production equipment is sophisticated. Some 20% of this equipment is only a few months old, and Wesley management has committed to a capital improvement plan that will continue to upgrade capital equipment and facilities over the next several years.

Historically, contracts have been performed on time and to specification. Research contracts have produced noticeable advances in the state of the art.

Wesley has small business and labor surplus area programs. Results of these programs are typical for this area.

Wesley has a total capacity of \$60 million. Since 19X4, they have operated at varying levels of production, 19X4 - 81%, 19X5 - 88%, 19X7 - 72%. Volume projections for 19X8 and 19X9 appear firm at 82% and 85%, respectively, of capacity unless currently unanticipated business is received.

## APPENDIX 2

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### WESLEY ELECTRONICS

#### Contractor's Accounting System

Wesley Electronics uses a job order cost accounting system. This system is employed to maintain cost control on each task as well as identifiable portions of each task. We consider this system adequate for accumulation of costs under fixed priced and flexibly priced Government contracts. The system complies with Cost Accounting Standards Board, Cost Accounting Standards.

APPENDIX 3

WESLEY ELECTRONICS

Comments on Profit

The contractor has proposed a profit of \$636,964, which represent approximately 17% of contract effort. This 17% figure is the rate Wesley Electronics traditionally proposes for production efforts. In our opinion, the elements of cost are sufficiently delineated to permit determination of profit using a structured profit approach.

In the event you are using the DOD Weighted Guidelines Method, the DCAA and the Administrative Contracting Officer concurs on Wesley's estimated distribution of Facilities Capital by asset type:

Land	20.6%
Buildings	36.3%
Equipment	43.1%

## APPENDIX 4

### WESLEY ELECTRONICS

#### Labor and Overhead Rate Recommendations

Subsequent to the issuing of the subject proposal, Wesley Electronics submitted a labor and overhead rate proposal for negotiation of forward pricing rates. While the formal audit report has not been issued to the Administrative Contracting Officer, this office, based on our preliminary review, has developed preliminary recommended rates for your use.

The following recommended rates are based on regression analysis of contractor provided historical and projected data. We feel that these recommended rates, using contractor provided data, present a more accurate projection of contractor estimated costs.

TABLE OF OVERHEAD AND LABOR RATES			
Account	Year	Proposed	Recommended
Material	19X8	2.1%	2.1%
	19X9	2.1%	2.1%
Engineering	19X8	84.0%	73.5%
	19X9	84.0%	71.8%
Manufacturing	19X8	200.0%	169.8%
	19X9	200.0%	165.6%
G&A Expense	19X8	5.1%	5.5%
	19X9	5.1%	5.3%
LABOR RATE RECOMMENDATIONS			
Engineering	19X8	\$18.68	\$18.68
	19X9	\$20.80	\$19.80
Manufacturing	19X8	\$9.80	\$9.80
	19X9	\$10.20	\$10.20

The following attachments illustrate how the overhead rates were developed using a personal computer spreadsheet program.

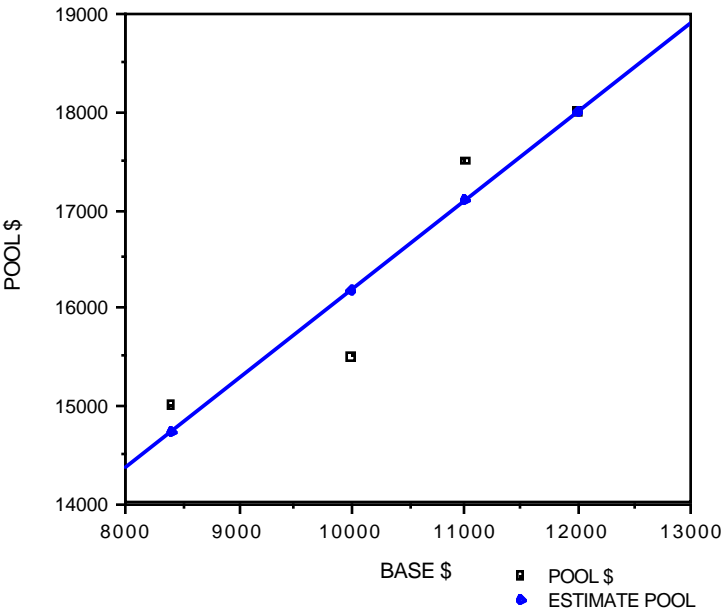
APPENDIX 4 (Continued)

MANUFACTURING OVERHEAD RATE ANALYSIS

OVERHEAD DATA

Pool	Base	Estimate Pool
15500	10000	16183.17
18000	12000	17993.64
17500	11000	17088.40
15000	8400	14734.79

REGRESSION OF HISTORICAL DATA  
(Coefficient of Determination: 0.0891307)



MANUFACTURING OVERHEAD ESTIMATES

Projection Year	19X8	19X9
Pool	15277.93	15730.55
Base	9000	9500
Rate	169.8%	165.6%

## APPENDIX 4 (Continued)

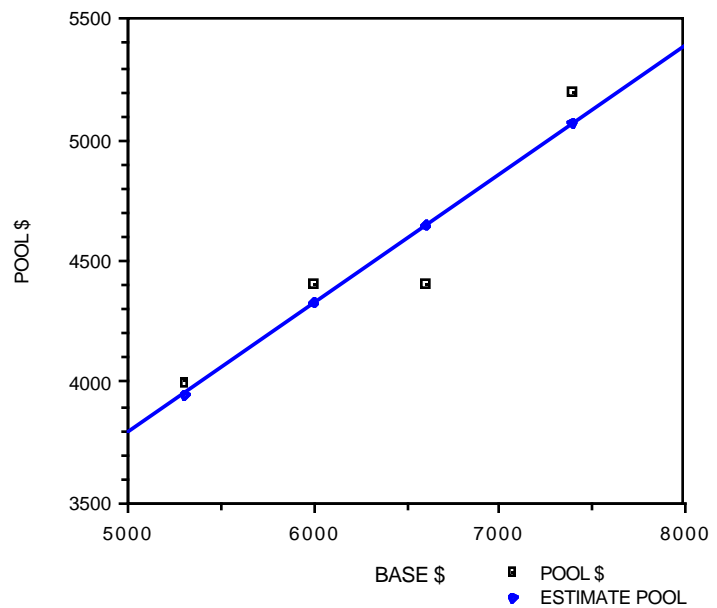
### ENGINEERING OVERHEAD RATE ANALYSIS

OVERHEAD DATA

Pool	Base	Estimate Pool
4400	6600	4646.283
5200	7400	5071.832
4400	6000	4327.120
4400	5300	3954.764

REGRESSION OF HISTORICAL DATA

(Coefficient of Determination: 0.888895)



### ENGINEERING OVERHEAD ESTIMATES

Projection Year	19X8	19X9
Pool	4114.4	4380.3
Base	5600	6100
Rate	73.5%	71.8%

APPENDIX 4 (Continued)

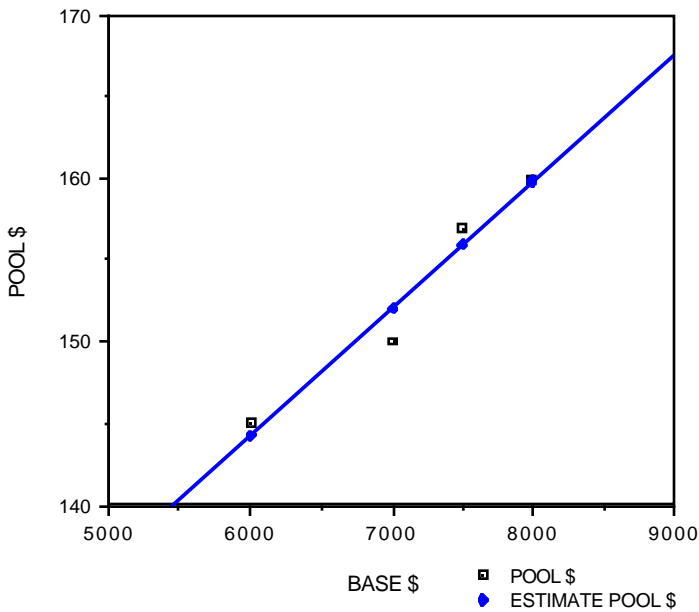
MATERIAL OVERHEAD RATE ANALYSIS

OVERHEAD DATA

Pool	Base	Estimate Pool
157	7500	155.91
160	8000	159.80
150	7000	152.02
145	6000	144.25

REGRESSION OF HISTORICAL DATA

(Coefficient of Determination: 0.95735)



MATERIAL OVERHEAD ESTIMATES

Projection Year	19X8	19X9
Pool	153.5829	157.4686
Base	7200	7700
Rate	2.1%	2.0%

## APPENDIX 4 (Continued)

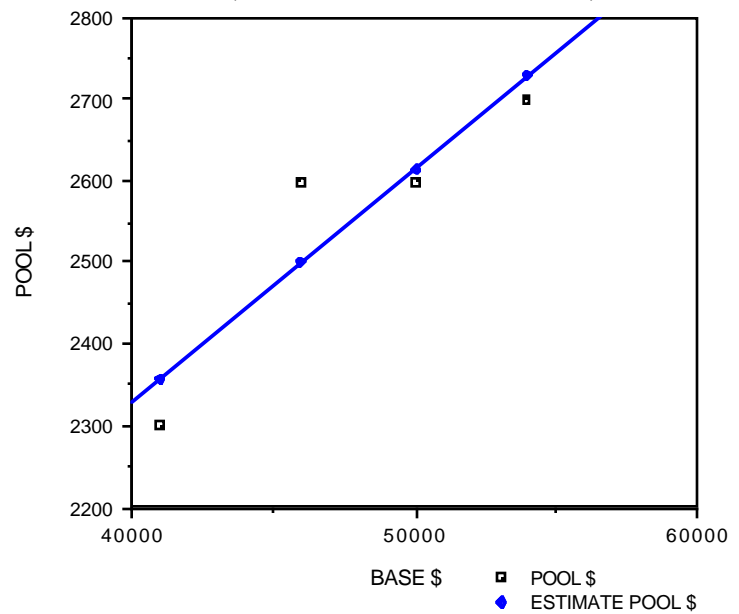
### GENERAL & ADMINISTRATIVE EXPENSE RATE ANALYSIS

OVERHEAD DATA

Pool	Base	Estimate Pool
2600	46000	2500.000
2700	54000	2728.571
2600	50000	2614.286
2300	41000	2357.143

REGRESSION OF HISTORICAL DATA

(Coefficient of Determination: 0.84127)



### GENERAL & ADMINISTRATIVE EXPENSE RATE ANALYSIS

Projection Year	19X8	19X9
Pool	2452.714	2544.829
Base	44345	47569
Rate	5.5%	5.3%

**APPENDIX 4 (Continued)**

**OVERHEAD RATE HISTORY AND RECOMMENDATIONS SUMMARY**  
 (Base and Pool estimates are in thousands of dollars)

ACCOUNT	19X4		19X5		19X6		19X7	
	Pool (\$)	Base (\$)	Pool (\$)	Base (\$)	Pool (\$)	Base (\$)	Pool (\$)	Base (\$)
Material	157	7,500	160	8,000	150	7,000	145	6,000
Engineering	4,400	6,600	5,200	7,400	4,400	6,000	4,000	5,300
Manufacturing	15,500	10,000	18,000	12,000	17,500	11,000	15,000	8,400
G&A	2,600	46,000	2,700	54,000	2,600	50,000	2,300	41,000
<b>RATES</b>	19X4		19X5		19X6		19X7	
Material	2.1%		2.0%		2.1%		2.4%	
Engineering	66.7%		70.3%		73.3%		75.5%	
Manufacturing	155.0%		150.0%		159.1%		178.6%	
G&A	5.7%		5.0%		5.2%		5.6%	

ACCOUNT	19X8*		19X9*	
	Pool (\$)	Base (\$)	Pool (\$)	Base (\$)
Material	154	7,200	157	7,700
Engineering	4,114	5,600	4,380	6,100
Manufacturing	15,278	9,000	15,731	9,500
G&A	2,453	44,345	2,544	47,569
<b>RATES</b>	19X8*		19X9*	
Material	2.1%		2.0%	
Engineering	73.5%		71.8%	
Manufacturing	169.8%		165.6%	
G&A	5.5%		5.3%	

\*Recommendations

**APPENDIX 4 (Continued)**

<b>RECOMMENDED CAS 414 COST OF MONEY FACTORS SUMMARY</b>					
<b>19X8</b>	<b>Pool</b>	<b>NBV</b>	<b>Cost of Money*</b>	<b>Base</b>	<b>COM Factors</b>
	Material	\$1,500,000	\$120,000	\$7,200,000	0.01667
	Engineering	\$2,650,000	\$212,000	\$5,600,000	0.03786
	Manufacturing	\$22,050,000	\$1,764,000	\$9,000,000	0.19600
	G&A	\$1,537,500	\$123,000	\$44,345,000	0.00277
<b>19X9</b>	<b>Pool</b>	<b>NBV</b>	<b>Cost of Money*</b>	<b>Base</b>	<b>COM Factors</b>
	Material	\$1,500,000	\$120,000	\$7,700,000	0.01558
	Engineering	\$2,650,000	\$212,000	\$6,100,000	0.03475
	Manufacturing	\$22,050,000	\$1,764,000	\$9,500,000	0.18568
	G&A	\$1,537,500	\$123,000	\$47,569,000	0.00259

\*Cost of Money at 8 percent

# FPRA SUMMARY

## TABLE OF OVERHEAD AND LABOR RATES

	Account	Year	Proposed	FPRA
<b>Overhead</b>	Material	19X8	2.1%	2.1%
		19X9	2.1%	2.0%
	Engineering	19X8	84.0%	74.2%
		19X9	84.0%	72.5%
	Manufacturing	19X8	200.0%	169.8%
		19X9	200.0%	166.4%
	G&A	19X8	5.1%	5.6%
		19X9	5.1%	5.4%
<b>Labor</b>	Engineering	19X8	\$18.68	\$18.65
		19X9	\$20.80	\$20.10
	Manufacturing	19X8	\$9.40	\$9.40
		19X9	\$10.20	\$10.11

**OVERHEAD RATE HISTORY AND PROJECTIONS**

(Base and Pool estimates are in thousands of dollars)

ACCOUNT	19X4		19X5		19X6		19X7	
	Pool (\$)	Base (\$)	Pool (\$)	Base (\$)	Pool (\$)	Base (\$)	Pool (\$)	Base (\$)
Material	157	7,500	160	8,000	150	7,000	145	6,000
Engineering	4,400	6,600	5,200	7,400	4,400	6,000	4,000	5,300
Manufacturing	15,500	10,000	18,000	12,000	17,500	11,000	15,000	8,400
ODC		1,843		3,240		3,950		2,155
G&A	2,600	46,000	2,700	54,000	2,600	50,000	2,300	41,000
<b>RATES</b>	19X4		19X5		19X6		19X7	
Material	2.1%		2.0%		2.1%		2.4%	
Engineering	66.7%		70.3%		73.3%		75.5%	
Manufacturing	155.0%		150.0%		159.1%		178.6%	
G&A	5.7%		5.0%		5.2%		5.6%	

ACCOUNT	19X8*		19X9*	
	Pool (\$)	Base (\$)	Pool (\$)	Base (\$)
Material	153	7,200	157	7,700
Engineering	4,073	6,488	4,336	6,978
Manufacturing	15,278	9,000	15,651	9,405
ODC		3,000		4,000
G&A	2,452	44,192	2,544	47,227
<b>RATES</b>	19X8*		19X9*	
Material	2.1%		2.0%	
Engineering	74.2%		72.5%	
Manufacturing	169.8%		166.4%	
G&A	5.6%		5.4%	

\*FPRA rates, all other rates in this table are actuals

CAS 414 COST OF MONEY FACTORS					
19X8	Pool	NBV	Cost of Money*	Base	COM Factors
	Material	\$1,500,000	\$120,000	\$7,200,000	0.01667
	Engineering	\$2,650,000	\$212,000	\$5,488,000	0.03863
	Manufacturing	\$22,050,000	\$1,764,000	\$9,000,000	0.19600
	G&A	\$1,537,500	\$123,000	\$44,345,000	0.00277
19X9	Pool	NBV	Cost of Money*	Base	COM Factors
	Material	\$1,500,000	\$120,000	\$7,700,000	0.01558
	Engineering	\$2,650,000	\$212,000	\$5,978,000	0.03546
	Manufacturing	\$22,050,000	\$1,764,000	\$9,405,000	0.18756
	G&A	\$1,537,500	\$123,000	\$47,569,000	0.00259

\*Cost of Money at 8 percent

